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THE DEVELOPMENT AND APPLICATION OF A NEW METHOD TO TEST THE RELATIVE EFFECTIVENESS OF SPECIFIC VISUAL PRODUCTION TECHNIQUES FOR INSTRUCTIONAL TELEVISION.

BY- COBIN, MARTIN T. MCINTYRE, CHARLES J.
ILLINOIS UNIV., URBANA

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A METHODOLOGICAL STUDY WAS CONDUCTED WHICH HAD AS ITS PRINCIPAL OBJECTIVES--(1) DEVELOPMENT OF A RELATIVELY SIMPLE, EFFECTIVE, AND ECONOMICAL WAY TO EVALUATE SPECIFIC (TELEVISION) VISUAL TECHNIQUES, AND (2) TEST THE METHOD IN A VARIETY OF SITUATIONS. A TWO CAMERA CLOSED-CIRCUIT TELEVISION SYSTEM WAS MODIFIED SO THAT THE OUTPUT OF THE TWO CAMERAS COULD BE FED TO ALL OF THE RECEIVERS ON THE CIRCUIT, OR AT THE WILL OF THE EXPERIMENTERS, BE DIVIDED SO THAT THE OUTPUT OF ONE CAMERA WENT TO ONE GROUP WHILE THE OUTPUT OF THE OTHER CAMERA WENT TO ANOTHER GROUP OF RECEIVERS. THE TELEVISION PRESENTATIONS WERE INTEGRATED WITH ONGOING CURRICULAR INSTRUCTION IN A COURSE INVOLVING 12 LESSONS IN EACH OF 2 SEMESTERS. THERE WERE APPROXIMATELY 300 STUDENTS INCLUDED IN A SERIES OF 26 EXPERIMENTS. SIGNIFICANT DIFFERENCES WERE DISCERNED WHICH HAVE IMPLICATIONS FOR TELEVISION PRODUCTION AND FOR FURTHER RESEARCH. THE METHOD DEVELOPED APPEARED USEFUL AS A RESEARCH TOOL FOR THE INVESTIGATION OF SELECTED VARIABLES WITHIN ITS RANGE OF SENSITIVITY. (JC)

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by Martin T. Cobin
ASSOCIATE PROFESSOR OF SPEECH AND THEATRE

and Charles J. McIntyre
ASSOCIATE PROFESSOR OF EDUCATION
COORDINATOR OF INSTRUCTIONAL TELEVISION

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I. PURPOSE

Of the many problems facing educators using instructional television, few are more pressing than those concerned with the best way to present the televised message so that it may have maximum effect.

The problem has been attacked on various fronts. Frequent studies have been made relative to utilization comparing variables extraneous to the medium such as class size, participation devices, proctoring and discussion arrangements and others (1, 2). Other studies (9) have been concerned with the organization of content. Film research, too, has been concerned with all of these (3, 4, 5, 7).

This study, while in no way minimizing the importance of determining optimum patterns of utilization or content organization, or of major approaches to production (e.g. lecture versus dramatic form, visual saturation, et cetera), developed from a basic concern with more humble questions.

This study grows from an interest in the myriad small questions of production which usually are raised only implicitly by the teacher or television director and answered not by recourse to data but more likely by intuition, "taste," or a feeling for what is best. These have to do with such implicit questions for example as how to choose among different ways to interpret a graph, or how to measure the appropriateness and impact of an electronic effect, or how to determine the impact and significance of the size or variety of one picture as compared to another.

That these kinds of choices are usually made implicitly and without resorting to empirical data may be traced primarily to the inconvenience and expense of obtaining data which bear on them. In film research, it is not uncommon to find studies of a single variable (e.g., camera angle) which have required the production of multiple versions of the same film with only the principal variable altered. The expenditure of money and effort needed to conduct research in this way frequently seems out of proportion to the generalizable new knowledge obtained. This becomes especially evident when one considers the vast number of other decisions, now made implicitly, for which, ideally, some empirical data should be gathered.

It appears, therefore, that the immediate need is not for more information _per se_ bearing on production decisions, but rather for the development of a _method_ to get this information in an easier and less costly manner, and thus to encourage its collection.

Such a method should possess the following characteristics:

1. Permit the introduction of discrete production variables as a part of, and without disturbing, the instructional process.
2. Permit the introduction of discrete production variables without substantially increasing operating costs.
3. Be useable in conjunction with student sampling and testing procedures which are feasible in conventional

instructional situations.

4. Require only production facilities which are already available or inexpensively secured.
5. Be sufficiently sensitive to permit discrimination between variables.

A workable method of evaluation sufficiently simple and economical to make wide scale application feasible would have the following advantages.

1. It would permit empirical answers to questions of production concerning an on-going course so that improvements in the course could be made in subsequent repetitions of it.
2. It would enable the profession to collect and classify examples of good and bad techniques. This might be the first step in building a data-based theory of effective instructional television production.

Hence, the objectives of this project were:

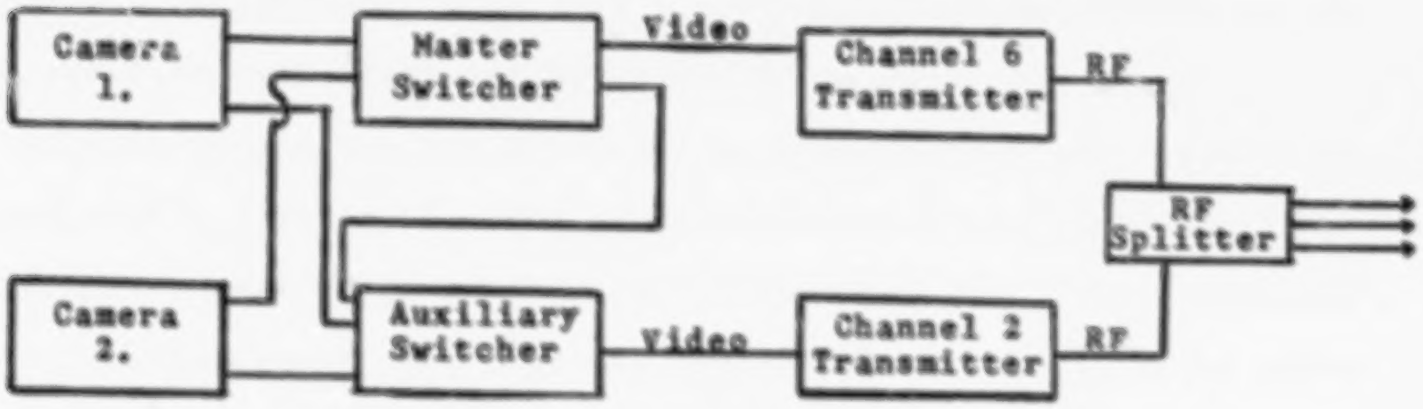
1. To develop a relatively simple, effective and economical method of evaluating the instructional effectiveness of specific visual production techniques.
2. To test the method in regard to a variety of production techniques.
3. To note and discuss obtained differences in the relative effectiveness of the production techniques tested.

II. PROCEDURE

The first step was to design and perfect a simple system of switching closed-circuit television signals so that the output of the two television cameras could either be fed to all of the receivers on the circuit in the usual manner, or at the will of the experimenters be divided so that the output of one camera went to one group of receivers while the output of the other camera or of both cameras together (as with superimposures) went to another group of receivers.

Operationally, the system worked like any conventional two-camera closed-circuit television system with multiple receivers all receiving the same sound and picture, except that when desired by the experimenters a group of receivers received a picture from one camera while another group received a picture from another or from both. Hence, the video was the same for all students except when an experimental variable was introduced at which time one group saw one version of the variable, the other group saw the other version. Immediately thereafter, the pictures for both groups were again the same. Audio was the same for both groups throughout. There was no reason to suppose that the students knew that their colleagues in another room were occasionally receiving somewhat different pictures or, if they did, at what times the pictures differed.

Diagrammatically the system appears as follows:



By feeding the master switcher into the auxiliary switcher, it was unnecessary to use the auxiliary switch, unless an actual split in picture outputs was desired.

The modification was made on a RCA TK-15 (vidicon) system. The additional equipment required and the approximate cost was:

1 Video distribution amplifier	$295.00
1 RF transmitter	600.00
1 video switcher	280.00
2 RF splitters	12.00
Miscellaneous wire, cable, hardware, etc.	50.00
Total	$1237.00

Television presentations were integrated with on-going curricular instruction in a basic course in oral interpretation offered within the Department of Speech and Theater at the University of Illinois. The choice of this particular course was completely independent of any considerations of the experimental objective. The use of this course did permit a realistic motivational framework for the teaching and testing, provided a sufficient number of subjects, and--because of the background of one of the investigators--facilitated the task of integrating the television techniques with the subject matter being presented. The television presentations dealt with major theoretical concepts in the course and occurred in twelve of the forty-five meetings of the class. The course was taught in this way for two successive semesters (fall and spring semesters, 1960-61) at both 1 P.M. and again at 3 P.M. The basic design called for the 3 P.M. presentations to constitute a replication of the 1 P.M. presentations; the exceptions to this are noted in the subsequent discussion. The term "trial" will be used here to designate a particular experimental presentation. For example, initial running of an experiment will be distinguished from its replication later in the same afternoon by the respective labels "trial 1" and "trial 2".

The fall semester began with 82 students enrolled at 1 P.M., 81 at 3 P.M. At each time, students were assigned viewing rooms on the basis of random selection. The same procedure was followed during the second semester, which started with 83 and 64 students at the two times. Analysis of test results indicated the viewing groups were not significantly different at the start. In the first semester, however, one of the viewing groups in the second trial seemed to make a better adjustment than the other as the semester progressed. The experiment included all students electing to take the course at the hours involved. There was no freedom of choice or advance notice regarding participation in television instruction or in any type of experimentation. The fall semester's experimental sections constituted 44% of the students enrolled in all sections of the course; the spring semester's experimental sections constituted 49%. In both semesters student drop-out in the experimental sections was consistent with normal drop-out.

The major variables dealt with were as follows:

1. one superimposition vs. three repetitive superimpositions
2. word visuals vs. picture equivalents
3. word visuals vs. symbol equivalents
4. clear visuals vs. distorted visuals
5. dolly vs. switch vs. fixed camera
6. notetaking vs. non-notetaking
7. one camera vs. two cameras
8. normal video vs. organizational video
9. sustained visual vs. pulsating visual
10. fixed visual vs. visual uncovered by wipe
11. acoustically reinforced visual vs. unreinforced visual
12. rhythmic switching vs. non-rhythmic switching
13. constant close-up vs. variety of shots (with and without eye contact held constant)
14. in-process visuals vs. completed visuals
15. word visuals vs. abstract figures
16. video plus audio vs. audio only
17. eye contact vs. no eye contact
18. panning vs. switching
19. visual aids in student's hands vs. on TV screen
20. rhythmic switching vs. fixed picture
21. switch vs. on-air rackover

22. on-air rackover vs. concealed rackover

23. concealed rackover vs. switch

24. zoom vs. switch

A number of these variables were probed by more than one experiment. A number of experiments probed more than one contrast in variables. The twenty-four contrasts presented above, therefore, do not constitute a sequence of twenty-four experiments. In fact, although twenty-four experimental days were involved (twelve each semester), only the first twenty-two used the two periods available for purposes of replication. On the last two days, the desire to extend the scope of the investigation prompted the exploration of a different problem at each of the available times. Having attempted to replicate twenty-two experiments, then, the last four experimental periods were utilized for four distinct experiments, none of which was replicated. The result was twenty-six experiments, the last four with no replication planned; with technical problems of one sort or another interfering with replication in a few other instances as noted. The exact nature of the variables in each experiment is clearly presented in Appendix A.

Statistical tests employed were $\underline{t}$ tests, chi square, and analysis of variance. For the purposes of the investigation, a .05 level of significance was considered meaningful if it occurred in both the initial running and in the replication of the experiment--that is, in trial 1 and trial 2. Since the usefulness of the research method is of prime importance, there seems value in reporting .01 and .001 levels of significance as well--when they occur--merely to indicate the ability of the method to establish differences at these levels of significance. Statistical tests analyzed data obtained from measurements made of student responses during or immediately after the television presentations. Student responses were made always while the students remained in the same viewing room in which they had received the televised instruction. Details of the tests used to measure student response are presented for each experiment, in sequence, in Appendix B.

III. RESULTS

The results of the investigation are most meaningfully presented if the individual experiments are considered with respect to their interrelationships rather than their chronological sequence. At the expense of some overlap, five classifications can be set up to reflect these interrelationships. A sixth classification is necessary to accommodate the three experiments dealing with variables having no definite interrelationships. These six classifications, with the experiments they include, are as follows:

A. The form of the visual (experiments 1,2,3,8,9,15).

B. Camera number (experiments 4,5,11,12,13,14,18,20,22,23,24,25,26).

C. The video dimension (experiments 16,19,21).

D. Eye contact (experiments 11,13,17).

E. Notetaking (experiments 4,6,13,14).

F. Miscellaneous (experiments 6,7,10).

The classifications can be considered in turn. To avoid duplication because of the overlap in experiments within classifications, all the statistical data are presented--in regular experiment sequence--in Appendix A. Testing information and certain pertinent testing materials are placed in Appendix B. Table and page references within the discussion are to these appendices when preceded by the letter "A" or "B".

A. The form of the visual

Six experiments explored questions regarding the relative effectiveness of different means of presenting visual materials.

Teachers taking advantage of the video dimension of instructional television, often make extensive use of visual aids. It seems pertinent, then, to consider how television might best present these visual aids to the viewer.

In experiment 1(A 1-3; B 1), visual aids were superimposed on the picture of the instructor. In both viewing rooms, each superimposition appeared and then disappeared. In one viewing room only, the individual superimpositions were repeated two additional times. The visual aids helped establish the larger concepts to which were related the details being discussed by the instructor. At the conclusion of the presentation, the students were tested in two ways as to their understanding of the relationship of details to larger concepts. The scores on the first of these tests (requiring an outline of the instructional content) were analyzed by a treatments X subjects X conditions analysis of variance (Tables 1.1, 1.2, 1.3, A 2). The only significant F that appeared on both trials would seem to be the result of the obvious disparity in the type of errors made--there were many more instances of items omitted (inclusion errors) than of items being improperly related to other items (subordination errors). Students were also asked to relate items to a supplied outline. The scores on this test were analyzed by t test comparisons (Table 1.4, A 3) which showed significant differences that were, however, in opposite directions on the two separate trials. Clearly, then, no experimentally significant differences were established between single or repetitive superimpositions. It should be noted that a large percentage of the students were first semester freshmen and the vast majority of all the students were having their initial contact with instructional television. Classroom observers recorded great unevenness in responses and indicated that students often failed to notice superimpositions because of the distracting mechanics of notetaking.

In experiment 2 (A 4-6; B 1-2), a sequence of randomly assorted words, picture equivalents and symbol equivalents were presented to all students. Words transmitted to one viewing group were matched by picture or symbol equivalents to the other viewing group. While one group saw the word "house," the other group saw a picture of a house. While one group saw the triangle symbol, the other group saw the word "triangle." Students could be scored on their ability to recall words, pictures, and symbols. Recall was tested immediately after presentation at the beginning of the period. A treatments X subjects analysis of variance contrasted words with pictures (Tables 2.2, 2.3, A 5) and revealed a significant F on both trials. The means recorded on both trials indicated higher scores on pictures than on words (Table 2.1, A 5). A similar significant superiority of symbols over words was revealed on both trials (Tables 2.4, 2.5, 2.6, A 6). Reference to the tables shows one of these F's significant at the .05 level and the other three significant at the .001 level. In spite of this, the actual lecture items best remembered in a test following the lecture suggest an opposite tendency. For the lecture, all reinforcing visuals presented to one viewing room were words; all reinforcing visuals presented to the other viewing room were pictures. Students were tested on their recall of lecture items. A t test analysis revealed higher mean scores in the viewing groups seeing words, with a significant difference on the first trial only (Table 2.7, A 6). The disparity between the results of the "pure" and the "applied" tests might be an artifact of the tests. When the word-picture contrast was applied to the lecture, it served to reinforce concepts developed in words and tested in words. In the "pure" comparison, the picture was the main stimulus rather than a reinforcement.

In experiment 3 (A 7-11; B 2), visuals were presented in random sequence with one viewing group receiving a distorted version of whatever visual the other group received clearly, and vice versa. Students were tested on their ability to recall items. This test was administered immediately after the presentation of these visuals at the beginning of the period and, again, at the end of the period, with an instructional presentation in between. A treatments X subjects analysis of variance revealed significant F's on both trials (Tables 3.1, 3.2, A 8). A t test comparison of the individual treatments (Table 3.3, A 9) bears out the notion that, for both trials, the significance of the F ratio is at least as much the result of the clear-distorted contrast as of the pre-lecture and post-lecture contrast. Even when the power of the statistical test is decreased by ignoring the analysis of variance and simply computing the t's directly (Table 3.4, A 10), there is still a firmly established superiority of clear over distorted visuals with statistically significant figures on the pre-lecture results of both trials. In spite of this fact, as in experiment 2, there was no comparable superiority when the treatments were applied to the lecture. For this application, one viewing group received only clear visuals to reinforce concepts; the other viewing group received only distorted visuals. Students were tested on their recall of reinforced lecture items, with no significant difference revealed on either trial (Table 3.5, A 11). It should be pointed out that the amount of distortion was slight. This experiment was not conceived so as to seek deliberately to achieve inferior instruction in one viewing room and make for a clear test of the research method. The experiment did serve such a function; but the use of distortions was motivated by the concept that a slightly distorted visual--sustained long enough to be understandable--might require more conscious attention on the part of the viewer and, therefore, make a more lasting impression. Such, of course, was not the case.

In experiment 8 (A 20-21; B 5), the visual material was presented either by sustaining the picture of it for ten seconds or by employing a succession of fade-ins and fade-outs to achieve a pulsating effect during the ten second period. The expectation was that the pulsations might have attention-getting value. What one viewing group saw pulsated, the other group saw sustained and vice versa. A random series of items were presented in this way prior to the main lecture and students were tested on their immediate recall of the items. A treatments X subjects analysis of variance (Tables 8.1, 8.2, 8.3, A 21), revealed no significant difference in the ability of students to recall sustained or pulsated visuals. During the instructional presentation, all visuals were sustained for one viewing group and pulsated for the other. A t test analysis of student scores on a test of their ability to recall lecture items (Table 8.4, A21) also failed to reveal any significant differences.

In experiment 9 (A 22-24; B 5-6), procedures identical to those of experiment 8 were employed to compare visuals presented in their entirety and visuals that were uncovered by a wipe technique. In this instance, the visuals--all words--were sometimes presented only visually, sometimes reinforced by having the words read aloud as they were seen. A treatments X subjects analysis of variance of the immediate recall of items presented prior to the main lecture revealed significant F's on both trials (Tables 9.1, 9.2, A 23). A _t_ test comparison of the treatments involved (Table 9.3, A 24) indicates that the significance was less the result of difference between fixed or wiped visual and more the result of difference between acoustic reinforcement or lack of such reinforcement. In the main instructional presentation, all visuals to one viewing room were uncovered by a wipe, all those to the other room were not. A _t_ test analysis of the results on a test of student ability to recall lecture items revealed no significant difference on either trial. (Table 9.4, A 24). There was no difference in the audio treatment during the lecture itself--that is, the effect of audio reinforcement was not even explored since both viewing groups received the benefit of such reinforcement during the lecture.

In experiment 15 (A 42-43, B 8), a comparison was made between completely formed visuals and visuals that were in process of being formed. A common instructional application of this comparison would be in the choice between writing on the blackboard while the students watched or having everything written out in advance. Some of the visuals used in this experiment were words, others were abstractions--enabling comparisons in the ability to recall items of one type or the other. This phase of the investigation is to be distinguished from the contrast of words and symbols in experiment 2 in that the abstractions of experiment 15 had no symbolic meaning and no verbal equivalents. Words and abstractions were presented, in random order, to the two viewing rooms. When one viewing group saw the visual in process of being formed, the other saw it only in its completed form, and vice versa. Students were scored in their immediate recall ability for each type of visual and the results subjected to an analysis of variance, using a Lindquist (6) Type VI design (Tables 15.1, 15.2, 15.3, A 43). In both trials, significant F ratios were revealed, establishing the superiority of in process abstractions over fixed abstractions. Examination of the means (Table 15.3, A 43) indicates that the superiority of symbols over words established in experiment 2 does not apply to the contrast between words and abstractions.

In exploring these various visual forms, then, specific differences have been established as experimentally significant. In no case, however, was a difference established within the framework of a total instructional presentation. While, in "pure" form, a student may recall pictures or symbols better than words, audio reinforced visuals better than unreinforced visuals, or in-process abstractions better than completely formed abstractions, there is no evidence in these six experiments to indicate that what he learns from a total instructional situation is significantly altered by the use made of those visual forms considered.

B. Camera number

Thirteen experiments compared variables that were essentially one-camera as opposed to two-camera techniques. The comparison is of interest because of the situations in which available equipment suggests the possibility of employing only one camera in an instructional presentation. The one camera techniques are also available, of course, during multiple camera presentations.

In experiment 4 (A 12-14, B 3), a lecture was presented following a highly organized outline. The organizational relationships of the various parts of the lecture were related to the television picture of the lecturer--degree of close-up depending on organizational level of importance. Changes in picture to reinforce changes in organizational level were accomplished for one viewing room by dollying the "on-air" camera, for the other viewing room by switching from one camera to another--the switch occurring just as the dolly was completed. At the conclusion of the lecture, students were asked to organize specific concepts in outline form. Outline items were scored for errors in sequential placement (vertical errors) and for errors in degree of subordination (horizontal errors). In other words, two types of errors were recognized: 1) an item could be placed on the outline too early or too late; or 2) an item could be improperly indented and fail to show correctly its position as a major heading or as a particular level of sub-heading. Analysis of variance established no significant difference. The only significant F (Table 4.3, A 13) simply indicates a difference, on trial 2, between the types of errors made.

In experiment 5 (A 15-17; B 3-4), the television director was confronted with the task of using only one camera to transmit the presentation to one viewing room while being free to employ a second camera as well for the other viewing room. He was free to move either camera as he saw fit and to change lenses on the second camera while the picture from the first camera was being fed to both viewing rooms. For the viewing room getting a two-camera presentation, any of the normal devices for changing pictures could be employed. Within the limitations imposed, the director--a man of considerable experience and sensitivity--was asked to present both viewing rooms with as effective a presentation as possible. The lecture sought to teach students how to perform certain analytical tasks. The students were scored on their ability to perform these tasks. Chi square analysis revealed no difference in performance of the two groups. The data (Tables 5.1 and 5.2, A 16) suggest, however, that the measuring instrument may have been too crude to discriminate varying levels of ability. The only significant difference noted in the t test (Table 5.3, A 17) was in favor of the two-camera group, but this showed up on one task only and on one trial only.

In experiment 11 (A 27-31; B 6), one viewing-room group saw a constant close-up of the instructor. The other viewing-room group saw the instructor in a variety of shots, as the second camera was employed freely. In comparison with experiment 5, the one-camera presentation was completely constant with no camera movement whatever. Students filled out a ten dimension semantic differential type attitude scale (7) and were scored on answers to objective questions on instructional content. Analysis of variance revealed an F significant at the .001 level on both trials (Tables 11.1, 11.2, A 28). Examination of the attitude scales (B 6, 12) will suggest the strong possibility of error resulting from the accumulative effect of evaluating several similar dimensions. Nevertheless, significant differences are recorded in the _t_ test comparisions on individual scales. These differences (trial 1: interesting-boring, good-bad, varied-monotonous, satisfactory-unsatisfactory; trial 2: lively-dead, animated-listless) are all in favor of the constant close-up. The significant differences appear on different scales in each trial, but there is a clear consistency to the pattern of the preference. (Tables 11.3 and 11.4, A 29, 30). There is clearly no difference established in the _t_ test comparision of treatments with respect to learning (Table 11.5, A 31).

In experiment 12 (A 32-33; B 6-7), some items later included in a test were emphasized by means of a switch to a close-up, others by means of dollying in, still others were left without emphasis as the television picture remained fixed. All students were presented with items given each treatment. The significant F on trial 1 (Table 12.1, A 33) was not apparent on trial 2 (Table 12.2, A 33). This same relationship held true in the _t_ tests between treatments. Therefore, no real difference was established. In light of the awareness of an emerging disparity between the two viewing groups in trial 2, however, further exploration seemed in order.

In experiment 13 (A 35-37; B 7), the same contrast was made between constant close-up and shot variety as had been made in experiment 11. This time, however, difference in eye contact was removed as a confounding factor. The lecturer either looked into the taking lense of the close-up camera or he did not. At all times that he looked into this taking lense, the picture was fed to both viewing rooms. When the two viewing rooms had different pictures, neither one had a sense of direct eye contact. Student scores on objective questions regarding instructional content revealed no significant differences when submitted to t test analysis. Attitude scale responses also established no difference that held in common across both trials. Differences between trials is discussed under "notetaking."

In experiment 18 (A 49-50, B9-10), a reader presented the dialogue from a scene in a work of dramatic literature, attempting to guide the listeners in their awareness of the distinctions between characters. In one viewing room, the character differentiation was reinforced by use of a different picture whenever there was a change in character. The other viewing room group was shown the picture from one camera that remained fixed. One viewing room received the first passage treated one way, the second passage treated the other way; the treatments were reversed in the second viewing room during the same trial. This arrangement was repeated on the second trial but the sequence of the passages was changed. Students were asked to rate overall impact and television technique. These ratings were subjected to t test analysis and, for both trials, the television technique ratings on one of the passages were significantly different in favor of the one-camera technique (Table 18.2, A 50). Why one passage should differ from another is open to question. One possibility is that the better handled the material is, or the more inherently interesting it is, the less conscious people are of the techniques involved in its presentation. The preference for the impact of the one-camera presentation also registered for only one passage (the same passage that showed a difference on the technique preference), but this did not register on both trials (Table 18.1, A 50).

In experiment 20 (A 52-54; B 10), all visuals were introduced to the screen for one viewing-room group by means of a panning action by the camera while the other viewing-room group always saw the visuals appear as the result of a switch. Material reinforced by means of these visuals appeared in the form of objective questions for the students to answer. Students also marked attitude scales. A t test analysis of the objective question answers revealed no difference (Table 20.1, A 52) and a t test comparison of attitude scale responses established no differences that held across both trials. The only significant differences recorded were on trial 2 where switching was rated more "large" than "small" and panning was rated more "good" than "bad" (Table 20.3, A 54).

In experiment 22 (A 56; B 11), a discussion of metrical analysis was presented to one viewing group by means of a single fixed camera while the other group had two cameras between which rhythmic switching occurred to reinforce demonstrated metrical structures. Students were then required to perform specific operations in metrical analysis. (For a related experiment, see "miscellaneous.") A t test analysis of the results revealed no difference.

In experiment 23 (A 57; B 11), every switch in one viewing room was matched by an "on-air" rackover to a different lense in the other viewing room. Students were tested on their ability to recall items emphasized by these techniques. A t test analysis revealed the "on-air" rackover superior at the .001 level of significance. (Table 23.1, A 57). This experiment, however, was not replicated.

Experiments 24 (A 58; B 11), 25 (A 59; B 11), and 26 (A 60; B 11), all unreplicated, followed the same pattern as experiment 23, with contrasts of "on-air" rackover with concealed rackover, concealed rackover with switch, and zoom with switch respectively. In each case recall tests were given and t test analysis failed to reveal any significant differences.

Two specific differences, then, were established. Experiment 11 established an attitude preference for the constant close-up over a variety of shots. This experiment, it should be pointed out, made no effort to control for eye contact. There were times, undoubtedly, when the group that cut away from the close-up also lost some sense of direct eye contact with the instructor. Nevertheless, the experiment may serve to remind the director who starts cutting between cameras when he feels "stuck" with no motivation to leave the instructor, that the close-up of a face may itself be a visual of some interest. Experiment 18 established a preference for a one-camera television technique in handling a very particular--and possibly artificial--situation. In addition, the results of experiment 22 suggest the need for a replication of the one trial that indicated the emphasizing superiority of an "on-air" rackover over the switch. All other differences great enough to have statistical significance were isolated in nature and failed to meet predetermined requirements for experimental significance. However, all but one of these favored the one-camera presentation. The total picture that emerges is one of inability to establish any superiority of two-camera over one-camera technique. Granting the fact that the two-camera presentation was limited by the experimental situation and the facilities available, instructional television producers may nevertheless, feel a bit more comfortable about undertaking a particular operation with the limited resources of a one-camera installation.

C. The video dimension

Three experiments explored the relations between audio-video presentation and presentation by audio alone. The pertinence of this contrast lies in the awareness of the great difference in the expense and complexity of the two modes of transmission coupled with the extensive background of successful applications of instructional radio.

In experiment 16 (A 44-45; B 8-9), students were informed by the television instructor that there had been technical difficulties with the video dimensions; that the audio was good;

that if the video went bad during the presentation everybody should simply apply himself to the best of his ability and proper allowance would be made in computing the test grades. At this point, the picture was to be lost in one viewing room only. Just prior to the test, the picture was to be lost in the other viewing room also and both groups were to finish out the period without the video portion--both taking their test, therefore, under comparable conditions. All went as planned during the second trial. On the first trial, however, there really were technical difficulties. The start of the presentation was delayed slightly. There was intermittent interference in both audio and video throughout the trial. Because of this, the attitude scales (B 8-9) were administered to the trial 2 students only. Students in both trials were scored on their answers to objective questions dealing with the instructional content. The t test analysis of results on this content test established no difference in either trial (Table 16.1, A 44). In trial 2, the t test analysis of attitude scales (Table 16.2, A45) showed only three scales with significant differences. In contrast with the group receiving audio only, the group receiving video plus audio registered significantly different reactions to the presentation on the fast-slow, soft-hard, and large-small scale. No differences were registered on any of the more clearly evaluative scales such as satisfactory-unsatisfactory or monotonous-varied. Of the fifteen scales, twelve were in the direction of video plus audio, including the three that registered significant differences.

In experiment 19 (A 51; B 10), audio plus video was again contrasted with audio alone. This was motivated by several factors. First, it was desirable to conduct an experiment with these variables without the complication of technical distortions. Second, the failure to establish a significant difference was so contrary to expectation as to warrant further exploration. Third, there seemed value in setting up the experiment without faking a difficulty in transmission. In this experiment, therefore, the student's attention was called to the contribution to comprehension of the syntactic patterns of the spoken language. After a careful presentation of this contribution, the importance of syntactic pattern was exemplified. The exemplification consisted of the reading of two similar literary passages. Each passage was presented first with distorted syntactic patterns, then with proper syntactic patterns. This enabled the student to see the difference made by the proper handling of the syntactic patterns in the vocal delivery. After hearing the passage both ways, the student was given a test on the contents of the passage. This was done with both passages; but the students were told that the two readings of one of the passages would be made with no picture on the sets, so they could also get a sense of the impact made by the picture. Unknown to the students, one viewing group saw a picture whenever the other group did not. The sequence of picture-no picture was reversed from passage to passage and the sequence of passage was reversed from trial to trial. A t test analysis of student scores on objective tests on these passages failed to disclose any significant differences

(Table 19.1, A 51).

One of the obvious advantages in the video dimension of television is its ability to project visual aids. While many visual aids are reinforcing in nature, some actually carry the instructional burden. When this latter situation exists, one method of dispensing with the video dimension might be to present visual aids in the classroom itself. Experiment 21 (A 55; B 11) explored the feasability of such a method. A discussion of literary form was developed with the use of charts designed so as to register clearly both on a television screen and on a mimeographed sheet (B 13). Students were tested at the end of the period on items about which they received information from the charts only; i.e. specifics that were not actually presented in the words of the teacher. In one viewing room, students saw the charts only on the television sets. The television instructor cued in the charts by such simple statements as, "We can see from Chart 1,..." or "Let's look at Chart 2 now." In the other viewing room, the charts were never shown on the television sets but were distributed to the students, in mimeographed form, as they entered the viewing room. When a chart was called for, the set in this viewing room showed a picture of the instructor looking down onto his desk, presumably looking at the same chart the student was supposed to be looking at in order to follow the discussion. The mimeographed charts were stapled together and numbered in the same order in which they were brought into the discussion. A *t* test analysis of student scores on the objective test on instructional content failed to establish a significant difference. A significance difference was noted on the first trial only (Table 21.1, A 55), and this was in favor of the group having the visuals in mimeographed form in their hands.

The results of these three experiments would suggest that there are certain types of instructional presentations that may be handled just as effectively with the audio dimension alone. No experimentally significant differences were established. None of the statistically significant differences favored audio plus video over audio alone, although in experiment 16 there was a pattern of attitude preference for audio plus video.

D. Eye contact

Three experiments explored the effect of varying degrees of eye contact--that is, the extent to which the television instructor looked directly into the taking lense of the "on-air" camera. The pertinence of this lies in the related facts that television studio operation at times interferes with maintaining eye contact, television instructors do not always seek to maximize eye contact, and general theory concerning speech delivery consistently advocates the advantage of maintaining eye contact.

Experiments 11 (A 27-31; B 6) and 13 (A 34-37; B 7) have been described already in the "camera number" section. In experiment 11, there was a definite pattern of preference for the constant close-up over the variety of shots. Recognising that this might have been caused by the confounding eye contact variable, experiment 13 repeated the contrast with eye contact controlled. The $\underline{t}$ test analysis of the instructional content tests in both experiments 11 and 13 revealed no differences, as already noted, but a definite pattern of attitude response was apparent in both trials of experiment 11 and in the first trial of experiment 13. (Tables 11.3, 11.4, 13.2; A 29, A 30, A 36). The attitude responses in the second trial of experiment 13 (Table 13.3, A 37) do not follow this pattern at all. This second trial of experiment 13 was the only one of the four trials being considered for which the students did not take notes. To whatever extent the pattern of attitude responses has any significance, it seems that notetaking students seem to react to differences in constant close-up and shot variety independently of eye contact.

In experiment 17 (A 46-48; B 9), a direct attack was made on the problem of eye contact effect. The instructor was viewed by one group through one camera, through a second camera by the other group. The cameras remained fixed. Whenever the instructor was motivated to establish eye contact with his audience, he looked squarely into the taking lense of one camera--always the same one camera. He never looked at the other camera. The two trials were not complete replications. On trial 1, the cameras were placed sufficiently apart to result in a three-quarter-face view for those viewers never receiving eye contact. The _t_ test analysis of scores on an objective test on instructional content indicates superiority of eye contact at the .01 level of significance (Table 17.1, A 46). On trial 2, the two cameras were placed as close together as possible and no difference in learning was noted. Differences in attitude responses were noted only for the second trial, when eye contact was considered more fast then slow, more soft than hard, more large than small, and lack of eye contact was considered more sharp than dull--all at the .001 level of significance.

No differences were noted on such obvious evaluative dimensions as interesting-boring, bad-good. (Table 17.3, A 48).

As a result of these studies, the need for further exploration seems apparent. There also emerges an interesting hypothesis that is clearly amenable to experimental testing--namely, that the effect of eye contact may more properly be considered a function of angle of indirectness than of time percentage of indirectness. In other words, a member of an audience reacts not so much to the percentage of speaking time during which a speaker looks at him or does not look at him; but reacts more to the extent to which the speaker turns away from him when not maintaining eye content.

E. Notetaking

Four experiments explored the effects of notetaking upon students responding to instructional television. Three of these. experiments 4, 13, and 14, have been discussed already in the "camera number" section. Reference was made to experiment 13 in the "eye contact" section as well. Classroom observation very early in the sequence of experiments indicated that notetaking often interfered with the student's ability to respond to, or even notice, specific effects or techniques of the television presentation. There seemed to be value, therefore, in determining just what difference would be made if notetaking were abandoned. In making the necessary comparison, the students in one trial of an experiment took notes while those in the other trial did not. This was reversed on a subsequent experiment so as to control for any inherent difference with regard to the notetaking-learning relationships between the students in the two trials. For purposes of the present discussion, the variables compared between viewing groups can be ignored since the differences in treatment were common to both trials--that is, to both notetakers and non-notetakers.

Experiments 4 (A 12-14; B 3) and 6 (A 18; B 4) explored the effect of notetaking on student comprehension of the organizational structure of the instructional presentation. The _t_ test analysis of student scores in experiment 4 (Table 4.4, A14), revealed that the notetakers did significantly better. The notetakers in this instance were all the students in trial 1. The level of significance was .001. In experiment 6, the _t_ test analysis compared notetakers with non-notetakers according to treatment (Table 6.1, A 18). That is, the viewing room receiving a given treatment in trial 1 was compared with the viewing room receiving the same treatment in trial 2. This time, the notetakers were all the students in trial 2. Both treatment contrasts in experiment 6 revealed significant differences in favor of the notetakers, one at the .01 level of significance, the other at the .001 level. In both experiments 4 and 6, the television instructor controlled the notetaking by indicating the importance of concentration and the use of the present lesson as an exercise in concentration. For the appropriate trials, students were urged to take particularly careful notes or were told that, as a part of the exercise, they were to take no notes and were to concentrate on the reinforcing devices presented on the television sets. The viewing rooms were monitored.

Experiments 13 (A 34-37; B 7) and 14 (A 38-41; B 7-8), explored the effect of notetaking on the learning of factual material.

In terms of the contrast between notetaking and non-notetaking, the procedure differed from that of experiments 4 and 6 in three respects. First, students were scored on their ability to answer objective questions on instructional content rather than on organizational relationships. Second, students were asked to mark attitude scales (B 7-8). Third, students who were instructed to take no notes were told this was motivated by a desire to have them fully responsive to the presentation and that they would receive mimeographed outlines of the lecture as they left the viewing room at the end of the period. The t test analysis of scores on the objective questions revealed no significant difference in experiment 13 (Table 13.1 A 35) and a difference in favor of the non-notetakers in experiment 14, significant at the .05 level (Table 14.1, A 39). There were relatively few significant differences recorded on the attitude scales, (Tables 13.2, 13.3, 14.2 and 14.3, A 36, A 37, A 40, A 41). However, these scales suggest a marked difference in attitude responses between notetakers and non-notetakers. There is a clear pattern of preference for the constant close-up over shot variety by the notetakers and of the dolly over the switch by the non-notetakers:

The notetaking experiments, then, established the fact that notetaking is an aid to comprehension of the organizational relationship of the various parts of an instructional presentation; but that it does not necessarily help in the immediate recall of facts included in the presentation. The experiments also suggest that the response of students to instructional television, both in learning and in attitude, may be quite different when they take notes than when they do not.

F. Miscellaneous

Three experiments remain to be considered in detail. Each has pertinence in that it explored the effect of specific technical procedures.

In the preceding section on "notetaking", reference has already been made to experiment 6 (A 18; B 4). This experiment is also closely related to experiment 4, already discussed in the "camera number" section. Experiment 6 explored the value of controlling changes in the picture so as to increase the student's grasp of the organizational structure of the instructional presentation. The picture was changed, as in experiment 4, so that degree of close-up corresponded with level of importance in organizational structure. In experiment 4, these changes were accomplished for one viewing group by dollying and for the other viewing group by switching. In experiment 6, however, both viewing groups had the benefit of two cameras but the correspondence of degree of close-up to level of organizational importance was established for one viewing room only. In the other viewing room, changes in picture served no purpose other than to achieve variety. Students were tested as to their ability to relate items properly to an outline framework provided. The t test analysis of the scores achieved by the two viewing groups revealed no significant difference in either trial (Table 6.1, A 18).

Experiment 7 (A 19; B 4-5) explored the contribution that a complex of fades, cross-fades and cuts would make to teaching concepts of linguistic structure. In retrospect, it is apparent that this experiment was badly conceived. The technical reinforcement process was so complicated that it was not properly co-ordinated on the first trial. On the second trial all went as planned, but the pattern of student performance on the test of ability to make certain linguistic structure analysis operations suggested that the technical reinforcement produced confusion rather than clarity. This is apparent in the t test analysis of student scores (Table 7.1, A 19), where all group means favor the normal presentation--including the one operation that produced a difference that was significant at the .05 level. If the experiment has any value, it lies in the clear implication that excessive use of production "effects" can interfere with learning.

Experiment 10 (A 25-26; B 6) explored the effect of rhythmic switching on the understanding of metrics. This is the same effect explored in experiment 22, already discussed in the "camera number" section. Where experiment 22 compared rhythmic switching with a one camera presentation, however, experiment 10 employed two cameras for both viewing groups and gave both viewing groups the benefit of picture variety. When metrical analysis was discussed and exemplified in experiment 10, only one viewing group received the benefit of rhythmic switching to reinforce the rhythmic structure of passages being read aloud. At the conclusion of the presentation, students were asked to perform five tasks of metric analysis. These performances were scored as correct or incorrect and the differences between viewing groups subjected to a chi square analysis (Tables 10.1, 10.2, A 26). In total performance, but not in the performance of any individual task, the group receiving rhythmic switching did better on trial 1, but not on trial 2. There was clearly no experimentally significant difference established.

The unrelated nature of these three experiments does not motivate any comprehensive statement of common results.

G. General summary of results

A general overview achieved at the inevitable price of oversimplification may be helpful at this point. On page 36 are listed the twenty-six experiments, in sequence, with an abbreviated indication of the variables compared in each. Following this are two columns, one for pure comparisons--such as a simple recall of items presented prior to the lecture proper; the other for applied comparisons--such as a test of the effectiveness of some technique in the content of an instructional presentation. Entries in these columns are of several types. Where one of the variables is shown, the meaning is that this variable was established as significantly better on both trials. When the symbol "(1)" appears after the variable listed in this way, the meaning is that the significant difference was recorded on one trial only but there was only one trial. Whether the condition under which these differences were measured was a pure test or an applied test is shown by the column in which the variable is listed. A dash (--) indicates no significance established, the result of no significant difference on either trial or of a failure to find a significant difference in both of two trials. No marking at all indicates that there was no test involved. In one case, the word "opposite" appears, indicating statistically significant differences in opposite difections on the two trials. Thus, for experiment 9, two contrasts of variables are shown. The first comparison, between fixed and wiped, failed to establish a difference in either the pure test or the applied test. The second comparison established a significant difference between audio reinforced and unreinforced in favor of the audio reinforced in the pure test, and did not include an applied test. Tests of attitude are always designated as such; the lack of designation indicates a learning or recall test.

It will be seen that in nine pure test comparisons of variables, six (experiments 2, 2, 3, 9, 15, 18) significant differences were established on the basis of initial experiment and replication. In thirty-six comparisons of variables as they functioned when applied to the context of an instructional presentation, two (experiments 4--6, 11) were established as significant on the basis of experiment and replication, three (experiments 16, 17, 23) registered significant differences on experiments that were not replicated, and one (experiment 1) registered statistically significant differences in opposite directions on the initial experiment and its replication.

Experiment	Variables	Pure	Applied
1	1 super--3 supers		opposite
2	words--pictures	pictures	--
	words--symbols	symbols	--
3	clear-distorted	clear	--
4	dolly--switch		--
	notes--no notes (organiz.)		notes
5	1 camera-2 camera		--
6	normal--organiz. video		--
	notes-no notes (organiz.)		notes
7	normal--technical reinforcement		--
8	sustained--pulsating	--	--
9	fixed--wiped	--	--
	audio reinforced--unreinforced	reinforced	
10	rhythmic--non-rhythmic		--
11	with varying eye contact:		
	close-up--variety		
	attitude		close-up
	learning		--
12	dolly-switch-fixed		--
13	with eye-contact constant:		
	close-up--variety		
	attitude		--
	learning		--
	notes--no notes (facts)		--
14	dolly--switch		--
	attitude		--
	notes--no notes (facts)		--
15	in-process--formed	in process (abstractions)	
	words--abstractions	--	
16	video--video audio		--
	attitude		vid aud (1)
17	eye-contact--no eye contact		
	full-face-- 3/4 face		contact (1)
	full face--full face		--
	attitude		--
18	switch--fixed (differen.)	fixed	
19	video--video audio		--
20	pan--switch		--
	attitude		--
21	in hand--on screen		--
22	rhythmic switch--fixed		--
23	switch--on-air rackover		rack (1)
24	concealed rackover--on-air rackover		--
25	concealed rackover-switch		--
26	zoom--switch		--

IV. DISCUSSION OF RESULTS

A conventional two camera closed-circuit television system was modified at a cost of less than $1,250. Most of the components are useable as spares and would be needed for any multiple channel closed-circuit distribution system. Hence, the cost of electronic modification may be considered entirely reasonable.

The numerous comparisons made were carried out successfully within the context of the televised portions of normal class instruction. The tests were short and developed by the instructor. The analyses were conventional, well understood by many teachers and researchers, and easy to apply. The method permitted ready randomization of subjects and insured that instruction was constant for control and experimental groups except when deliberately varied. Hence, it may be said that the method was simple, economical and feasible to apply in a conventional instructional television situation.

The remaining question then is, "Did it work?" The answer to this is included in the answers to two other questions:
1) did it permit discrimination between variables? and 2) did it permit a discrimination between variables of any practical consequence with respect to instructional television production, utilization or research?

It has been shown that a number of significant differences both in student achievement and in attitude were found. Proportionally many more of the differences were found where variables were tested as an exercise preceding or following the instruction proper, rather than in conjunction with the course instruction. Presumably, the students were more motivated for the latter. The relative infrequency of differences in conjunction with course instruction is very likely another example of the phenomenon now common in instructional television research, namely, the failure to find significant differences between treatments.

The relative insensitivity of the method in the normal teaching situation apparently frustrates the hope that it might be used systematically to collect information about production details in an on-going course that could be used to improve later revisions of that course. Rather, it appears that the method will be most useful as a research tool for gathering data on problems concerning variables shown to be within its range of sensitivity.

That there are such problems has been clearly demonstrated in this study. Examples of them include the following:

1. The experiments indicated that the process of notetaking affects student response--both in attitude and, under some circumstances, in learning. The implications of this are far reaching. As self-evident as it seems when stated, the idea that students react differently when taking notes or when not taking notes has been ignored rather generally. Television production personnel apply concepts of good procedures and techniques, and teachers evaluate their own and their colleagues' instructional efforts with television on

a basis of their sensitivities as people who are not taking notes. They respond to what they see without any conscious realization that they might respond quite differently if they were doing what the student was doing--that is, taking notes.

2. The concept of eye contact, which is generally thought of as important in television presentation, emerged appearing somewhat conditional. Its significance may be less for those occupied in taking notes, and its effect may be more a function of the _angle_ by which eye contact is avoided than by the _length of time_ it is avoided.
3. Various results seem to be in conflict with apparently "good" television production technique and tend to suggest that students react favorably to simplicity. Thus students learned more when visuals were drawn before them (as on a blackboard) than when they were prepared in advance (as on a title card); they preferred constant close-ups to an ostensibly better paced variety of camera distances; they preferred fixed camera positions to conventional switching which attempted to show character differentiation; and in one unreplicated experiment they learned more when an on-air rackover was used instead of the conventional switch. Apparently the rackover served as an effective attention gaining device.

The point, of course, is not that these findings are definitive--the study was not designed for that--but rather that the data were easily obtained, and that the method can readily be applied to studies seeking more definitive answers to these and other questions.

Finally, it may be noted that only once did a significant difference occur in opposite directions. That this occurred at all is a source of some embarrassment, but let it be noted that it occurred on the first experiment when the experimenters were least familiar with the method. It never happened again.

V. SUMMARY AND CONCLUSIONS

A. Purpose

A study was conducted which had as its principal objectives: 1) to develop a relatively simple, effective and economical method of evaluating specific visual techniques, and 2) to test the method in regard to a variety of production techniques.

The purpose in developing and testing such a method was to permit and encourage the accumulation of data about the relative effectiveness of production details on which to base decisions that heretofore, because of the expense and difficulty of conventional research methodology, had been made implicitly, intuitively and subjectively by television directors and teachers.

B. Procedure

A two camera closed-circuit television system was modified so that the output of the two cameras either could be fed to all of the receivers on the circuit in the usual manner or at the will of the experimenters be divided so that the output of one camera went to one group of receivers while the output of the other camera (or of both cameras together as with superimposures) went to another group of receivers. The modification cost less

went to another group of receivers. The modification cost less

than $1,250 for additional components. Most of the extra components would be useful as spares or in the development of a multi-channel closed-circuit system.

The television presentations were integrated with on-going curricular instruction in a basic course in oral interpretation for twelve lessons in each of two semesters. During each semester, the television presentation was made to two different viewing groups at different hours. In general, experiments conducted the first hour were replicated during the second hour. The number of students included during the first and second semesters was 163 and 147 respectively.

Integrated into the television instruction were twenty-six experiments to test twenty-four variables in the major categories of: the form of the visual, camera number, the video dimension, eye contact, and note taking.

Short instructor-created tests were administered during the class sessions. Most tests were of student learning but some were of student attitude. In some instances, the variables were embedded within the context of the instruction; in other instances, the variables were tested in short sessions during the instructional period but independently of the instruction. Such tests were designated "pure" comparisons.

The statistical tests used were the commonly understood analysis of variance, t tests and tests of chi square. A significant difference was said to have been found only when it occurred on both trials except in those few instances where there was no replication.

C. Results

1. In nine pure test comparisons of variables, six significant differences were found.

2. In thirty-six comparisons of variables as they functioned in the context of the instructional presentation, two significant differences were found in replicated experiments, three significant differences were found in unreplicated experiments and one replicated experiment yielded differences in opposite directions.

3. This project was methodological and not designed to study fully the effect of any particular set of variables. Nevertheless, it is pertinent to the assessment of the efficacy of the method to point out the following findings which have implications for instructional television production and utilization, and for further research.

a. Students' perception of good television teaching techniques may vary according to their perceived tasks, e.g., they respond differently if taking notes than if not.

b. The importance of eye contact appears to depend on concomitant activities of the student and upon the alternative behavior of the instructor.

c. Student preferences seem to argue for simplicity in production in that they selected a constant close-up over a variety of shots, a fixed camera position over switched pictures to achieve character differentiation, an on-air rackover versus the more common switch, and visuals developed in process rather than prepared in advance.

To avoid misunderstanding, let it be stressed that the above findings are not conclusive, nor was the study designed so that they could be. They are, however, provocative and the developed method could be used to study them further.

D. Conclusions

1. The developed method was inexpensive to create, and simple and economical to use in the context of on-going instruction.

2. It was effective in that a substantial number of significant

differences were discerned, some of which have obvious implications for instructional television production and utilization, and especially for further research.

3. The method is likely to be most useful as a research tool for the investigation of selected variables shown to be within its range of sensitivity.

REFERENCES

1. Carpenter, C. R., and Greenhill, L. P., An Investigation of Closed-Circuit Television for Teaching University Courses, Report No. 1, State College, Pennsylvania, The Pennsylvania State University, 1955

2. Carpenter, C. R., and Greenhill, L. P., An Investigation of Closed-Circuit Television for Teaching University Courses, Report No. 2, University Park, Pennsylvania, The Pennsylvania State University, 1958

3. Hoban, C., and van Ormer, E. B., Instructional Film Research 1918-1950 (Rapid Mass Learning), Technical Report 269-7-19, NAVEXOS P-977, State College, Pennsylvania, Pennsylvania State College Instructional Film Research Program for Special Devices Center, Port Washington, L. I., New York, 1950

4. Instructional Film Research Reports, Volume 1, Technical Report 269-7-36, NAVEXOS P-1220, Research by the Instructional Film Research Program, Pennsylvania State University for the U. S. Naval Training Devices Center, Office of Naval Research, Port Washington, L. I., New York, January, 1953

5. Instructional Film Research Reports, Volume 2, Technical Report 269-7-61, NAVEXOS P-1943 Research by the Instructional Film Research Program, Pennsylvania State University for the U. S. Naval Training Devices Center, Office of Naval Research, Port Washington, L. I., New York, June, 1956

6. Lindquist, E. F., Design and Analysis of Experiments in Psychology and Education, Boston, Houghton Mifflin Company, 1953

7. May, M. A., and Lumsdaine, A. A., Learning From Films, New Haven, Yale University Press, 1958

8. Osgood, C. E., Suci, G. J., and Tannenbaum, P. H., The Measurement of Meaning, Urbana, University of Illinois Press, 1957

9. Studies in Televised Instruction, Report Nos. 1-7, Metropolitan Pittsburgh Educational Television Station and American Institute for Research, Pittsburgh, Pennsylvania, 1961

APPENDIX A

STATISTICAL DATA

TABLES: EXPERIMENT 1

OUTLINING ERRORS IN RELATION TO SINGLE AND TRIPLE SUPERIMPOSITIONS OF REINFORCING VISUALS

Variables: one superimposition (1S) vs. three repetitive superimpositions (3S)

Measurements:
1. ability to outline, as revealed by inclusion errors (IE) and subordination errors (SE)
2. ability to relate items to a supplied outline

Statistical tests:
1. analysis of variance: Treatments (1S,3S) X Subject X Error type (IE,SE)
2. *t* test

Table 1.1

analysis of variance
measurement 1--trial 1

source	df	ss	ms	F	df	p
Between subjects	81	624.378				
Treatments (1S,3S)	1	3.926	3.926	.507	1,80	--
Error	80	620.452	7.756			
Within subjects	82	3309.500				
Error types (IE,SE)	1	2936.845	2936.845	631.308	1,80	.001
1S,3S-IE,SE interaction	1	.462	.462	.099	1,80	--
Error	80	372.193	4.652			
Total	163	3933.878				

Table 1.2

analysis of variance
measurement 1--trial 2

source	df	ss	ms	F	df	p
Between subjects	80	714.698				
1S,3S	1	44.698	44.698	5.269	1,79	.05
Error	79	670.129	8.483			
Within subjects	81	3205.000				
IE,SE	1	2770.987	2770.987	506.486	1,79	.001
1S,3S-IE,SE interaction	1	1.8	1.8	.329	1,79	--
Error	79	432.213	5.471			
Total	161	3919.827				

Table 1.3

means (errors)
measurement 1

trial	variable	IE	SE	N
1	1S	11.175	2.825	82
1	3S	10.980	2.405	82
2	1S	11.905	3.429	81
2	3S	10.641	2.590	81

Table 1.4

t tests
measurement 2

trial	variable	n	m	*t*	df	favor*	p
1	1S	40	5.700	2.283	80	3S	.05
1	3S	42	4.333				
2	1S	42	5.119	2.420	79	1S	.05
2	3S	39	6.641				

* Symbol reveals favored experimental variable in reverse of the mean column entry; the latter is based on number of incorrect answers.

TABLES: EXPERIMENT 2

REINFORCEMENT BY WORD VISUALS CONTRASTED WITH REINFORCEMENT BY PICTURE OR SYMBOL EQUIVALENTS

Variables: word visuals (W) vs. picture (P) or symbol (S) equivalents

Measurements:
1. immediate recall of words vs. pictures(both acoustically reinforced)
2. immediate recall of words vs. symbols (neither acoustically reinforced)
3. recall of lecture items reinforced by words or pictures

Statistical tests:
1. analysis of variance: Treatments (W,P) X Subjects
2. analysis of variance: Treatments (W,S) X Subjects
3. *t* test

Table 2.1

analysis of variance
measurement 1--trial 1

source	df	ss	ms	F	df	p
Treatments	1	56.681	56.681	6.044	1,82	.05
Subjects	82	589.446	7.188			
T X S	82	760.819	9.278			
Total	165	1406.946				

Table 2.2

analysis of variance
measurement 1--trial 2

source	df	ss	ms	F	df	p
Treatments	1	107.256	107.256	16.318	1,79	.001
Subjects	79	883.744	11.187			
T X S	79	519.244	6.573			
Total	159	1510.244				

Table 2.3

means
measurement 1

	P	W	N
trial 1	23.415	20.548	83
trial 2	24.737	19.262	80

Table 2.4

analysis of variance
measurement 2--trial 1

source	df	ss	ms	F	df	p
Treatments	1	91.524	91.524	54.479	1,83	.001
Subjects	83	266.119	3.206			
T X S	83	139.476	1.680			
Total	167	497.119				

Table 2.5

analysis of variance
measurement 2--trial 2

source	df	ss	ms	F	df	p
Treatments	1	79.393	79.393	48.529	1,78	.001
Subjects	78	176.975	2.269			
T X S	78	127.607	1.636			
Total	157	383.975				

Table 2.6

means
measurement 2

	S	W	N
trial 1	8.536	7.0595	84
trial 2	8.722	7.304	79

Table 2.7

t tests
measurement 3

trial		n	m	t	df	favor	p
1	W	42	6.190	3.142	81	W	.01
1	P	41	4.537				
2	W	42	6.667	1.353	78	W	--
2	P	38	5.947				

TABLES: EXPERIMENT 3

REINFORCEMENT BY CLEAR OR DISTORTED VISUALS

Variables: clear visuals (C) vs. distorted visuals (D)

Measurements:
1. immediate recall of items presented prior to lecture (Pre C and Pre D)
2. immediate recall of lecture items reinforced by clear or distorted visuals (LC and LD)
3. delayed recall of items presented prior to lecture (Post C and Post D)

Statistical tests:
1. analysis of variance: Treatments (Pre C, Pre D, Post C, Post D) X Subjects
2. *t* test

Table 3.1

analysis of variance
measurements 1 and 3--trial 1

source	df	ss	ms	F	df	p
Treatments	3	242.057	80.686	24.667	3,246	.05
Subjects	82	1740.295	21.223			
T X S	246	804.693	3.271			
Total	331	2787.045				

Table 3.2

analysis of variance
measurements 1 and 3--trial 2

source	df	ss	ms	F	df	p
Treatments	3	236.210	78.737	26.555	3,225	.01
Subjects	75	1349.921	17.999			
T X S	225	677.237	2.965			
Total	303	2099.421				

Table 3.3

t tests
measurements 1 and 3 (246 df, 225 df)

trial	variable	n	m	*t*	df	favor	p
1	Pre C	83	8.602	4.715	246	Pre C	.001
1	Pre D	83	7.277				
2	Pre C	76	8.132	3.491	225	Pre C	.001
2	Pre D	76	7.158				
1	Post C	83	7.157	3.388	246	Post C	.001
1	Post D	83	6.205				
2	Post C	76	7.526	2.545	225	Post C	.05
2	Post D	76	7.158				
1	Pre C	83	8.602	5.142	246	Pre C	.001
1	Post C	83	7.157				
2	Pre C	76	8.132	2.172	225	Pre C	.05
2	Post C	76	7.526				
1	Pre D	83	7.277	3.815	246	Pre D	.001
1	Post D	83	6.205				
2	Pre D	76	7.158	1.226	225	Pre D	--
2	Post D	76	6.816				

Table 3.4

t tests
measurements 1 and 3 (164 df, 150 df)

trial	variable	n	m	*t*	df	favor	p
1	Pre C	83	8.602	3.011	164	Pre C	.01
1	Pre D	83	7.277				
2	Pre C	76	8.132	2.347	150	Pre C	.05
2	Pre D	76	7.158				
1	Post C	83	7.157	2.251	164	Post C	.05
1	Post D	83	6.205				
2	Post C	76	7.526	1.614	150	Post C	--
2	Post D	76	6.816				
1	Pre C	83	8.602	3.432	164	Pre C	.001
1	Post C	83	7.157				
2	Pre C	76	8.132	1.515	150	Pre C	--
2	Post C	76	7.526				
1	Pre D	83	7.277	2.410	164	Pre D	.05
1	Post D	83	6.205				
2	Pre D	76	7.158	.755	150	Pre D	--
2	Post D	76	6.816				

Table 3.5

t tests
measurement 2

trial	variable	n	m	t	df	favor	p
1	LC	41	8.732	.239	81	LC	--
1	LD	42	8.619				
2	LC	39	8.718	.779	73	LD	--
2	LD	37	9.000				

TABLES: EXPERIMENT 4

THE IMPACT OF DOLLYING, SWITCHING, AND NOTETAKING ON THE GRASP OF ORGANIZATIONAL RELATIONSHIPS

Variables: 1. organizational dolly (D) vs. organizational switch (S)
2. notetaking (NT) vs. non-notetaking (NNT)

Measurements: ability to relate items to the organizational structure of the lecture (vertical errors: VE and horizontal errors: HE)

Statistical tests: 1. analysis of variance: Treatments (S, D) X Subjects X Error types (VE,HE)
2. *t* test

Table 4.1

analysis of variance
dolly vs. switch--trial 1

source	df	ss	ms	F	df	p
Between Subjects	83	7142.208				
Treatments (S,D)	1	84.291	84.291	0.979	1,82	--
Error	82	7057.917	86.072			
Within Subjects	84	318.500				
Error types (VE,HE)	1	0.149	0.149	0.039	1,82	--
S,D-VE,HE interaction	1	2.149	0.026	0.007	1,82	--
Error	82	316.202	3.856			
Total	167	7460.708				

Table 4.2

analysis of variance
dolly vs. switch--trial 2

source	df	ss	ms	F	df	p
Between Subjects	76	5915.494				
Treatments (S,D)	1	175.637	175.637	2.295	1,75	--
Error	75	5739.857	76.531			
Within Subjects	77	337.857				
Error types (VE,HE)	1	23.377	23.377	5.601	1,75	.05
S,D-VE,HE interaction	1	1.402	0.017	0.004	1,75	--
Error	75	313.078	4.174			
Total	153	6253.494				

Table 4.3

means (errors)
dolly vs. switch

trial	variable	VE	HE	N
1	S	9.500	9.667	84
1	D	11.143	10.857	84
2	S	15.128	14.538	77
2	D	13.184	12.211	77

Table 4.4

t test
notetaking (trial 1) vs. non-notetaking (trial 2)

trial	variable	N	m	t	df	favor*	p
1	NT	168	10.292	16.605	320	NT	.001
2	NNT	154	13.779				

* Symbol reveals favored experimental variable in reverse of mean column entry; latter is based on number of answers incorrect.

TABLES: EXPERIMENT 5

IMPACT OF ONE-CAMERA AND TWO-CAMERA PRESENTATIONS

Variables: one camera (1C) vs. two cameras (2C)

Measurements:
1. ability to identify major emotional dimensions of a literary passage
2. ability to identify minor emotional dimensions of a literary passage

Statistical tests:
1. chi square: based on answers right (R) and wrong (W)
2. *t* tests

Table 5.1

chi square
measurement 1--trial 1

criterion	variable	R	W	N	χ^2	df	p
1	1C	21	19				
	2C	14	26				
				80	1.829	1	--
2	1C	40	0				
	2C	39	1				
				80	0.0	1	--
3	1C	39	1				
	2C	40	0				
				80	0.0	1	
4	1C	32	8				
	2C	36	4				
				80	.882	1	--

Table 5.2

chi square
measurement 1--trial 2

criterion	variable	R	W	N	χ^2	df	p
1	1C	18	18				
	2C	23	14				
				73	.658	1	--
2*	1C	36	0				
	2C	37	0				
				73			
3*	1C	36	0				
	2C	37	0				
				73			
4	1C	33	3				
	2C	36	1				
				73	.294	1	--

* The statistical test is inapplicable here because of the inability of the measurement device to make evaluative distinctions on this criterion.

Table 5.3

t tests
measurement 2

criterion	trial	variable	n	m	*t*	df	favor	p
1	1	1C	40	12.450	.350	78	2C*	--
	1	2C	40	12.025				
	2	1C	36	12.639	.930	71	2C*	--
	2	2C	37	11.324				
2	1	1C	40	53.400	.196	78	1C	--
	1	2C	40	53.125				
	2	1C	36	53.528	2.002	71	2C	.05
	2	2C	37	56.649				
3**	2	1C	36	56.778	.563	71	2C	--
	2	2C	37	58.351				

* This reverses the means; the latter are error scores.
** Criterion 3 was not tested on trial 1.

TABLE: EXPERIMENT 6

IMPACT OF NORMAL VIDEO, ORGANIZATIONAL VIDEO, AND NOTETAKING ON THE GRASP OF ORGANIZATIONAL RELATIONSHIPS

Variables: 1. normal video (NV) vs. organizational video (OV)
2. notetaking (NT) vs. non-notetaking (NNT)

Measurement: ability to relate items to the organizational structure of the lecture

Statistical test: *t* test

Table 6.1

t tests

trial	variable	n	m	*t*	df	favor	p
1	OV	38	23.105	.709	77	OV	—
1	NV	41	21.341				
2	OV	38	29.632	1.845	72	NV	--
2	NV	36	33.250				
1	NNT-OV	38	23.105	3.118	74	NT-OV	.01
2	NT-OV	38	29.632				
1	NNT-NV	41	21.341	4.946	75	NT-NV	.001
2	NT-NV	36	33.250				

TABLE: EXPERIMENT 7

THE CONTRIBUTION TO UNDERSTANDING LINGUISTIC STRUCTURE
OF A VISUAL REINFORCING COMPLEX OF FADES, CROSS-FADES, AND CUTS
(UNREPLICATED BECAUSE OF TECHNICAL FAILURE OF FIRST ATTEMPTED RUN)

Variables: technical reinforcement (TR) vs. normal video (NV)

Measurements:
1. ability to perform three tasks of linguistic structure analysis (criteria 1, 2, 3) on a written language sample
2. average score on all three tasks (Avr)

Statistical test: *t* tests

Table 7.1

t tests

criterion	variable	n	m	*t*	df	favor	p
1	NV	37	90.324	.514	72	NV	--
1	TR	37	88.595				
2	NV	37	92.676	.687	72	NV	--
2	TR	37	92.027				
3	NV	37	91.162	2.026	72	NV	.05
3	TR	37	90.054				
Avr	NV	37	91.405	.321	72	NV	--
Avr	TR	37	91.081				

TABLES: EXPERIMENT 8

CONTRAST OF SUSTAINED AND PULSATING VISUALS

Variables: sustained visual (S) vs. pulsating visual (P)

Measurements:
1. immediate recall of items presented prior to lecture (S vs. P)
2. immediate recall of lecture items reinforced by sustained or pulsated visuals (LS vs. LP)

Statistical tests:
1. analysis of variance: Treatments (S,P) X Subjects
2. _t_ tests

Table 8.1

analysis of variance
measurement 1--trial 1

source	df	ss	ms	F	df	p
Treatments	1	3.143	3.143	.902	1,73	--
Subjects	76	1502.442	19.769			
T X S	76	264.857	3.485			
Total	153	1770.442				

Table 8.2

analysis of variance
measurement 1--trial 2

source	df	ss	ms	F	df	p
Treatments	1	11.919	11.919	2.919	1,73	--
Subjects	73	1562.892	21.409			
T X S	73	298.081	4.083			
Total	147	1872.892				

Table 8.3

means
measurement 1

	S	P
trial 1	9.377	9.662
trial 2	9.243	9.811

Table 8.4

_t_ tests
measurement 2

trial	variable	n	m	_t_	df	favor	p
1	LP	40	5.600	1.804	75	LP	--
1	LS	37	4.541				
2	LP	37	5.081	1.683	70	LS	--
2	LS	35	6.143				

TABLES: EXPERIMENT 9

IMPACT OF WIPING AND ACOUSTIC ACCOMPANIMENT ON THE REINFORCEMENT OF VISUALS

Variables:
1. fixed visual (F) vs. visual uncovered by a wipe (W)
2. acoustically reinforced visuals (R) vs. visuals presented with no acoustic reinforcement (NR)

Measurements:
1. immediate recall test of visuals presented in isolation
2. ability to recall lecture items presented with visual reinforcement

Statistical tests:
1. analysis of variance: Treatments (F-R, F-NR, W-R, W-NR) X Subjects
2. *t* tests (F vs. W)

Table 9.1

analysis of variance
measurement 1--trial 1

source	df	ss	ms	F	df	p
Treatments	3	39.600	13.200	12.256	3,207	.01
Subjects	69	160.586	2.327			
T X S	207	222.900	1.077			
Total	279	423.086				

Table 9.2

analysis of variance
measurement 1--trial 2

source	df	ss	ms	F	df	p
Treatment	3	33.405	11.135	12.769	3,195	.01
Subjects	65	144.405	2.222			
T X S	195	170.095	.872			
Total	263	347.905				

Table 9.3

_t_ tests
measurement 1

trial	variable	n	m	_t_	df	favor	p
1	F-R	70	3.400	4.897	207	F-R	.001
1	F-NR	70	2.543				
2	F-R	66	3.136	4.368	195	F-R	.001
2	F-NR	66	2.424				
1	W-R	70	2.971	2.937	207	W-R	.01
1	W-NR	70	2.457				
2	W-R	66	3.030	4.276	195	W-R	.001
2	W-NR	66	2.333				
1	F-R	70	3.400	2.451	207	F-R	.05
1	W-R	70	2.971				
2	F-R	66	3.136	.650	195	F-R	--
2	W-R	66	3.030				
1	F-NR	70	2.543	.491	207	F-NR	--
1	W-NR	70	2.457				
2	F-NR	66	2.424	.558	195	F-NR	--
2	W-NR	66	2.333				

Table 9.4

_t_ tests
measurement 2

trial	variable	n	m	_t_	df	favor	p
1	W	36	8.611	1.968	68	W	--
1	F	34	7.147				
2	W	32	8.625	1.165	65	W	--
2	F	35	7.629				

TABLES: EXPERIMENT 10

EFFECT OF RHYTHMIC SWITCHING ON UNDERSTANDING METRICS

Variables: rhythmic (R) vs. non-rhythmic (NR) switching

Measurements: ability to perform five tasks of metric analysis

Statistical test: Chi square: based on task performance being correct (C) or incorrect (I)

Table 10.1

chi square
trial 1

task	variable	C	I	N	χ^2	df	p
1	R	29	9				
	NR	22	15				
				75	1.735	1	--
2	R	24	14				
	NR	17	20				
				75	1.600	1	--
3	R	17	21				
	NR	11	26				
				75	1.220	1	--
4	R	24	14				
	NR	24	13				
				75	.008	1	--
5	R	24	14				
	NR	21	13				
				75	.114	1	--
All	R	118	72				
	NR	95	90				
				375	3.990	1	.05

Table 10.2

chi square
trial 1

task	variable	C	I	N	χ^2	df	p
1	R	24	6				
	NR	23	12				
				65	1.010	1	--
2	R	23	7				
	NR	20	15				
				65	1.947	1	--
3	R	15	15				
	NR	16	19				
				65	.009	1	--
4	R	21	9				
	NR	21	14				
				65	.337	1	--
5	R	19	11				
	NR	25	10				
				65	.185	1	--
All	R	102	48				
	NR	105	70				
				325	1.859	1	--

TABLES: EXPERIMENT 11

CONSTANT CLOSE-UP CONTRASTED WITH SHOT VARIETY

Variables: constant close-up (CU) vs. variety of shots (V)

Measurements: 1. attitude scales (see appendix B)
2. lecture content objective test

Statistical tests: 1. analysis of variance: Treatments X Subjects (criterion: attitude scales)
2. *t* test (criterion: content knowledge)

Table 11.1

analysis of variance
measurement 1--trial 1

source	df	ss	ms	F*	df	p
Treatments	9	408.717	45.413	29.261	9,594	.001
Subjects	66	1014.445	15.370			
T X S	594	921.883	1.552			
Total	669	2345.045				

Table 11.2

analysis of variance
measurement 1--trial 2

source	df	ss	ms	F*	df	p
Treatments	9	500.368	55.596	35.593	9,630	.001
Subjects	70	935.758	13.368			
T X S	630	983.932	1.562			
Total	709	2420.058				

* The high F and the resultant level of significance may be due to a type G error; i.e. the accumulative effect of evaluating several similar dimensions.

Table 11.3

_t_ tests
measurement 1--trial 1

scale	variable	n	m	_t_	df	favor	p
1	CU	34	3.206	2.285	65	CU	.05
1	V	33	4.273				
2	CU	34	3.824	.006	65	CU	--
2	V	33	3.818				
3	CU	34	2.118	1.164	65	CU	--
3	V	33	2.515				
4	CU	34	2.676	3.060	65	CU	.01
4	V	33	3.848				
5	CU	34	3.824	1.556	65	CU	--
5	V	33	4.515				
6	CU	34	3.912	.851	65	CU	--
6	V	33	4.273				
7	CU	34	3.235	2.241	65	CU	.05
7	V	33	4.212				
8	CU	34	3.559	1.061	65	CU	--
8	V	33	4.030				
9	CU	34	1.529	.694	65	CU	--
9	V	33	1.758				
10	CU	34	2.353	2.657	65	CU	.05
10	V	33	3.485				

Table 11.4

t tests
measurement 1--trial 2

scale	variable	n	m	t	df	favor	p
1	CU	34	4.147	1.370	69	CU	--
1	V	37	4.946				
2	CU	34	3.618	.520	69	CU	--
2	V	37	3.811				
3	CU	34	3.118	1.406	69	CU	--
3	V	37	3.703				
4	CU	34	3.706	1.926	69	CU	--
4	V	37	4.459				
5	CU	34	4.824	1.229	69	CU	--
5	V	37	5.189				
6	CU	34	4.647	2.049	69	CU	.05
6	V	37	5.405				
7	CU	34	4.529	1.803	69	CU	--
7	V	37	5.243				
8	CU	34	4.206	2.061	69	CU	.05
8	V	37	4.919				
9	CU	34	2.059	.883	69	CU	--
9	V	37	2.324				
10	CU	34	3.706	.889	69	CU	--
10	V	37	4.108				

Table 11.5

t tests
measurement 2

trial	variable	n	m	*t*	df	favor	p
1	CU	34	13.559	1.358	65	CU	--
1	V	33	12.515				
2	CU	34	13.324	1.028	69	V	--
2	V	37	13.838				

TABLES: EXPERIMENT 12

RELATIVE EMPHASIS VALUE OF THE DOLLY, THE SWITCH, AND THE FIXED CAMERA

Variables: dolly (D) vs. switch (S) vs. fixed camera (F)

Measurement: ability to recall lecture concepts reinforced by dollying or switching, or presented with no change in picture.

Statistical tests:
1. analysis of variance: Treatments (D,S,F) X Subjects
2. *t* tests

Table 12.1

analysis of variance
trial 1

source	df	ss	ms	F	df	p
Treatments	2	5.503	2.752	3.664	2,132	.05
Subjects	66	189.224	2.867			
T X S	132	99.164	.751			
Total	200	293.891				

Table 12.2

analysis of variance
trial 2

source	df	ss	ms	F	df	p
Treatments	2	.768	.384	.493	2,130	--
Subjects	65	188.874	2.906			
T X S	130	101.232	.779			
Total	197	290.874				

Table 12.3

t tests
between treatments

trial	variable	n	m	*t*	df	favor	p
1	D	67	2.358	2.342	132	D	.05
1	S	67	2.015				
2	D	66	2.258	.592	130	D	--
2	S	66	2.167				
1	D	67	2.358	2.342	132	D	.05
1	F	67	2.015				
2	D	66	2.258	.394	130	F	--
2	F	66	2.318				
1	F	67	2.015	.000	132	--	--
1	S	67	2.015				
2	F	66	2.318	.986	130	F	--
2	S	66	2.167				

TABLES: EXPERIMENT 13

CONSTANT CLOSE-UP CONTRASTED WITH SHOT VARIETY WITH EYE CONTACT HELD CONSTANT; AND THE EFFECT OF NOTETAKING ON LEARNING FACTUAL MATERIAL

Variables:
1. constant close-up (CU) vs. shot variety (V) with eye-contact held constant
2. notetaking (NT) vs. non-notetaking (NNT)

Measurements:
1. ability to answer objective questions on lecture content
2. attitude scales (see Appendix B)

Statistical test: _t_ tests

Table 13.1

t tests
measurement 1

trial	variable	n	m	t	df	favor	p
1	CU	40	4.500	.287	80	CU	--
1	V	42	4.381				
2	CU	31	3.806	.871	61	V	--
2	V	32	4.312				
1	NT-CU	40	4.500	1.549	69	NT-CU	--
2	NNT-CU	31	3.806				
1	NT-V	42	4.381	.131	72	NT-V	--
2	NNT-V	32	4.312				
1	NT	82	4.439	1.087	143	NT	--
2	NNT	63	4.063				

Table 13.2

t tests
measurement 2--trial 1 (notetakers)

scale	variable	n*	m	t	df	favor	p
1	CU	41	4.500	.565	81	CU	--
1	V	42	4.310				
2	CU	41	6.049	1.164	81	CU	--
2	V	42	5.786				
3	CU	41	4.902	.402	81	CU	--
3	V	42	4.762				
4	CU	41	4.707	.000	80	--	--
4	V	41	4.707				
5	CU	40	4.725	.611	80	CU	--
5	V	42	4.524				
6	CU	40	4.400	.906	80	CU	--
6	V	42	4.071				
7	CU	41	4.732	3.012	81	CU	.01
7	V	42	3.690				
8	CU	40	4.400	1.329	80	CU	--
8	V	42	4.000				
9	CU	41	5.610	.266	81	CU	--
9	V	42	5.524				
10	CU	41	4.875	2.139	79	CU	.05
10	V	40	4.317				

* Differences are the result of unmarked scales.

Table 13.3

t tests
measurement 2--trial 2 (non-notetakers)

scale	variable	n	m	t	df	favor	p
1	CU	29	3.172	1.315	59	V	--
1	V	32	3.844				
2	CU	31	4.645	.604	61	V	--
2	V	32	4.875				
3	CU	32	4.903	.352	62	CU	--
3	V	32	4.719				
4	CU	32	4.355	.549	62	V	--
4	V	32	4.594				
5	CU	30	3.800	1.730	60	V	--
5	V	32	4.594				
6	CU	31	3.258	1.031	61	V	--
6	V	32	3.656				
7	CU	32	3.742	.422	62	V	--
7	V	32	3.938				
8	CU	31	3.774	.464	61	V	--
8	V	32	3.969				
9	CU	31	6.032	.670	61	CU	--
9	V	32	5.750				
10	CU	31	4.032	1.484	60	V	--
10	V	31	4.645				

TABLES: EXPERIMENT 14

EFFECT OF DOLLYING, SWITCHING, AND NOTETAKING

Variables: 1. dolly (D) vs. switch (S)
2. notetaking(NT) vs. non-notetaking (NNT)

Measurements: 1. ability to answer objective questions on lecture content
2. attitude scales (see appendix B)

Statistical test: t test

Table 14.1

t test
measurement 1

trial	variable	n	m	*t*	df	favor	p
1	D	43	9.302	1.353	82	D	--
1	S	41	8.122				
2	D	30	9.200	2.303	58	D	.05
2	S	30	6.800				
1	NNT-D	43	9.302	.111	71	NNT-D	--
2	NT-D	30	9.200				
1	NNT -S	41	8.122	1.329	69	NNT-S	--
2	NT-S	30	6.800				
1	NNT	84	9.250	2.340	142	NNT	.05
2	NT	60	8.000				

Table 14.2

t test
measurement 2--trial 1 (non-notetakers)

scale	variable	n	m	*t*	df	favor	p
1	D	42	4.428	2.070	81	D	.05
1	S	41	3.610				
2	D	43	5.000	1.795	82	D	—
2	S	41	4.561				
3	D	43	4.814	1.914	82	D	—
3	S	41	4.098				
4	D	43	4.209	.919	82	D	—
4	S	41	3.878				
5	D	43	3.884	1.094	82	D	—
5	S	41	3.488				
6	D	43	3.698	1.973	82	D	—
6	S	41	3.122				
7	D	43	3.814	1.195	82	D	—
7	S	41	3.415				
8	D	43	4.093	2.807	82	D	.01
8	S	41	3.220				
9	D	43	6.000	.280	82	D	—
9	S	41	5.220				
10	D	43	4.140	1.662	81	D	—
10	S	40	3.475				

Table 14.3

t test
measurement 2--trial 2 (notetakers)

scale	variable	n	m	*t*	df	favor	p
1	D	30	4.133	.532	55	S	--
1	S	27	4.370				
2	D	30	5.100	.759	56	S	--
2	S	28	5.428				
3	D	30	5.067	.466	56	D	--
3	S	28	4.857				
4	D	30	4.300	.191	56	S	--
4	S	28	4.393				
5	D	30	4.033	.322	56	S	--
5	S	28	4.178				
6	D	30	3.267	1.388	56	S	--
6	S	28	3.821				
7	D	30	3.833	.110	56	D	--
7	S	28	3.786				
8	D	30	3.733	.045	56	D	--
8	S	28	3.714				
9	D	30	6.000	.568	56	D	--
9	S	28	5.786				
10	D	29	4.414	.337	55	D	--
10	S	28	4.250				

TABLES: EXPERIMENT 15

THE EMPHASIS EFFECT OF PRESENTING VISUALS IN PROCESS OF COMPLETION, ALREADY COMPLETED, AS WORDS, AND AS ABSTRACT FIGURES

Variables:
1. visuals in process of being written out or drawn while viewed (IP) vs. visuals already formed and fixed (F)
2. words (W) vs. abstract figures (A)

Measurement: ability to recall items presented in any combination of the variables involved

Statistical test: analysis of variance: Lindquist, Type VI (Between subjects: Viewing room groups--Gp1, Gp2; Within subjects--IP, F, W, A)

Table 15.1

analysis of variance
trial 1

source	df	ss	ms	F	p
Between subjects	77	362.824			
Gpl,Gp2	1	16.367	16.367	3.59	--
Error	76	346.457	4.559		
Within subjects	234	678.250			
IP,F	1	85.157	85.157	49.14	.01 (IP>F)
W,A	1	7.080	7.080	2.20	--
IP,F-W,A	1	21.029	21.029	9.30	.01(IP> F for A, not W)
IP,F-Gpl,Gp2	1	3.888	3.888	2.24	--
W,A-Gpl,Gp2	1	6.847	6.847	2.13	--
IP,F-W,A-Gpl,Gp2	1	5.909	5.909	2.61	--
Error: within	228	548.339			
IP,F	76	131.704	1.733		
W,A	76	244.823	3.221		
IP,F-W,A	76	171.812	2.261		
Total	311	1041.074			

Table 15.2

analysis of variance
trial 2

source	df	ss	ms	F	p
Between subjects	57	281.914			
Gpl,Gp2	1	1.212	1.212	<1	--
Error	56	280.702	5.013		
Within subjects	174	372.000			
IP,F	1	21.121	21.121	15.21	.01(IP>F)
W,A	1	.069	.069	<1	--
IP,F-W,A	1	1.069	1.069	<1	--
IP,F-Gpl,Gp2	1	5.111	5.111	3.69	--
W,A-Gpl,Gp2	1	.829	.829	<1	--
IP,F-W,A-Gpl,Gp2	1	6.663	6.663	4.34	.05
Error: within	168	335.927			
IP,F	56	77.768	1.389		
W,A	56	172.102	3.073		
IP,F-W,A	56	86.056	1.537		
Total	231	653.914			

Table 15.3

means

	IP-W	F-W	IP-A	F-A
trial 1	5.308	4.782	6.128	4.564
trial 2	5.207	4.638	5.207	4.569

TABLES: EXPERIMENT 16

VIDEO PLUS AUDIO CONTRASTED WITH AUDIO ONLY (INTERMITTENT INTERFERENCE--AUDIO AND VIDEO--ON TRIAL 1)

Variable: video plus audio (VA) vs. audio only (A)

Measurement: 1. ability to answer questions on lecture conte
2. attitude scales (see Appendix B)

Statistical test: _t_ test

Table 16.1

_t_ tests
measurement 1

trial	variable	n	m	_t_	df	favor	p
1*	A	41	13.512	.704	77	A	--
1*	VA	38	12.816				
2	A	31	12.484	.391	59	VA	--
2	VA	30	12.833				

* Intermittent interference (both Audio and Video).

Table 16.2

_t_ tests
measurement 2--trial 2

scale	variable	n	m	_t_	df	favor	p
1	VA	29	5.345	2.780	58	VA	.01
1	A	31	4.258				
2	VA	29	4.896	.742	58	VA	--
2	A	31	4.548				
3	VA	28	5.678	1.053	57	VA	--
3	A	31	5.161				
4	VA	29	4.931	3.287	58	VA	.01
4	A	31	3.968				
5	VA	26	4.769	2.082	55	VA	.05
5	A	31	4.032				
6	VA	29	4.034	.053	58	VA	--
6	A	31	4.000				
7	VA	29	4.552	.057	58	A	--
7	A	31	4.581				
8	VA	28	4.214	.262	57	VA	--
8	A	31	4.097				
9	VA	29	4.310	.066	58	A	--
9	A	31	4.323				
10	VA	29	4.586	1.375	58	VA	--
10	A	31	4.194				
11	VA	29	4.241	.100	58	VA	--
11	A	31	4.194				
12	VA	29	4.517	.062	58	VA	--
12	A	31	4.484				
13	VA	29	4.448	.645	58	VA	--
13	A	31	4.097				
14	VA	29	4.000	.476	58	A	--
14	A	31	4.226				
15	VA	29	4.138	.075	58	VA	--
15	A	31	4.097				

TABLES: EXPERIMENT 17

EYE CONTACT

Variables: eye contact contrasted with no eye contact, as follows:

1. full-face eye contact (FE) vs. three-quarter-face view with no eye contact (3/4 NE)--run 1
2. full-face eye contact (FE) vs. full-face view with no eye contact (FNE)--run 2

Measurements:
1. ability to answer questions on lecture content
2. attitude scales (see appendix B)

Statistical test: t test

Table 17.1

t tests
measurement 1

trial	variable	n	m	t	df	favor	p
1	FE	39	11.590	3.262	75	FE	.01
1	3/4NE	38	8.684				
2	FE	31	9.484	.517	59	FE	--
2	FNE	30	8.900				

Table 17.2

t tests
measurement 2--trial 1

scale	variable	n	m	*t*	df	favor	p
1	E	39	4.769	1.446	75	E	--
1	NE	38	4.289				
2	E	39	3.718	.475	75	NE	--
2	NE	38	3.868				
3	E	39	4.538	.918	75	NE	--
3	NE	38	4.895				
4	E	38	4.316	1.338	74	NE	--
4	NE	38	4.605				
5	E	37	4.108	.320	72	NE	--
5	NE	37	4.189				
6	E	39	3.282	.868	75	NE	--
6	NE	38	3.605				
7	E	39	3.462	1.508	75	NE	--
7	NE	38	4.053				
8	E	39	3.462	.208	75	NE	--
8	NE	38	3.526				
9	E	39	3.590	1.445	75	E	--
9	NE	38	3.158				
10	E	39	4.154	.968	75	NE	--
10	NE	38	4.368				
11	E	39	3.385	.728	75	E	--
11	NE	38	3.158				
12	E	39	3.692	1.807	75	NE	--
12	NE	38	4.395				
13	E	39	3.410	.301	75	NE	--
13	NE	38	3.526				
14	E	39	3.256	.366	75	E	--
14	NE	38	3.132				
15	E	39	3.641	.340	75	NE	--
15	NE	38	3.763				

Table 17.3

t tests
measurement 2--trial 2

scale	variable	n	m	t	df	favor	p
1	E	31	5.258	5.072	59	E	.001
1	NE	30	4.333				
2	E	31	4.161	.576	59	NE	--
2	NE	30	4.400				
3	E	31	4.548	1.185	59	NE	--
3	NE	30	5.100				
4	E	31	4.871	5.290	58	E	.001
4	NE	29	4.379				
5	E	30	4.633	4.141	57	E	.001
5	NE	29	4.310				
6	E	31	3.806	.844	59	NE	--
6	NE	30	4.233				
7	E	30	3.967	.142	58	NE	--
7	NE	30	4.000				
8	E	31	3.935	.412	59	NE	--
8	NE	30	4.133				
9	E	30	3.767	.873	58	NE	--
9	NE	30	4.167				
10	E	30	4.600	1.705	58	E	--
10	NE	30	4.000				
11	E	31	3.290	2.776	58	NE	.001
11	NE	29	4.345				
12	E	31	3.710	1.531	59	NE	--
12	NE	30	4.500				
13	E	31	3.032	1.555	59	NE	--
13	NE	30	3.833				
14	E	31	3.258	.783	59	NE	--
14	NE	30	3.600				
15	E	31	3.613	1.308	59	NE	--
15	NE	30	4.233				

TABLES: EXPERIMENT 18

RELATION OF SWITCHING TO CHARACTER DIFFERENTIATION

Variable: Switching between two cameras to reinforce the character differentiation achieved by one person reading dialogue (S) vs. leaving the differentiation entirely to the reader who is covered by a single, fixed camera (F)

Measurement:
1. a single-scale rating of the overall impact of each of two readings (A and B)
2. a single-scale rating of the television technique employed to present each of the same two readings (A and B)

Statistical test: *t* test

Table 18.1

t tests
measurement 1

trial	variable	reading	n	m	t	df	favor	p
1	F	A	37	3.568	1.987	77	S	--
1	S	A	42	4.190				
2	F	A	30	4.267	1.327	56	S	--
2	S	A	28	4.929				
1	F	B	42	5.048	3.854	77	F	.001
1	S	B	37	3.784				
2	F	B	28	4.500	.962	56	F	--
2	S	B	30	4.167				

Table 18.2

t tests
measurement 2

trial	variable	reading	n	m	t	df	favor	p
1	F	A	37	3.351	.510	77	S	--
1	S	A	42	3.500				
2	F	A	30	4.233	.092	56	F	--
2	S	A	28	4.179				
1	F	B	42	4.667	3.785	77	F	.001
1	S	B	37	3.486				
2	F	B	28	4.071	2.393	56	F	.05
2	S	B	30	3.267				

TABLE: EXPERIMENT 19

RELATION OF VIDEO PLUS AUDIO TO AUDIO ONLY

Variables: video plus audio (VA) vs. audio only (A)

Measurement: ability to answer questions on each of two passages (1 and 2)

Statistical test: *t* test

Table 19.1

t tests

trial	variable	passage	n	m	*t*	df	favor	p
1	A	1	32	12.844	.931	66	VA	--
1	VA	1	36	13.889				
2	A	1	28	12.429	.049	55	VA	--
2	VA	1	29	12.483				
1	A	2	36	13.111	.727	66	A	--
1	VA	2	32	12.500				
2	A	2	29	11.517	.046	55	VA	--
2	VA	2	28	11.571				
1	A	1	32	12.844	.396	62	A	--
1	VA	2	32	12.500				
2	A	1	28	12.429	.793	54	VA	--
2	VA	2	28	11.571				
1	A	2	36	13.111	.639	70	VA	--
1	VA	1	36	13.889				
2	A	2	29	11.517	.805	56	VA	--
2	VA	1	29	12.483				

TABLES: EXPERIMENT 20

EFFECT OF PANNING IN CONTRAST WITH SWITCHING AS A MEANS OF EMPHASIZING A VISUAL

Variables: emphasis of a visual by panning to it (P) vs. switching to it (S)

Measurements:
1. ability to answer questions on the lecture content
2. attitude scales (see Appendix B)

Statistical test: *t* test

Table 20.1

t tests
measurement 1

trial	variable	n	m	*t*	df	favor	p
1	P	39	17.205	1.151	79	S	—
1	S	42	17.903				
2	P	27	17.444	.033	56	P	—
2	S	31	17.419				

Table 20.2

_t_ tests
measurement 2--trial 1

scale	variable	n	m	_t_	df	favor	p
1	P	38	3.526	1.798	78	P	--
1	S	42	3.381				
2	P	38	4.579	.498	76	P	--
2	S	40	4.550				
3	P	38	5.737	1.368	78	P	--
3	S	42	5.643				
4	P	38	4.105	.269	77	S	--
4	S	41	4.244				
5	P	37	4.270	.328	73	P	--
5	S	38	3.947				
6	P	38	4.368	.504	73	S	--
6	S	42	4.452				
7	P	38	5.079	.697	78	S	--
7	S	42	5.167				
8	P	38	3.816	.091	78	S	--
8	S	42	4.214				
9	P	38	3.974	.177	77	S	--
9	S	41	4.122				
10	P	38	3.947	1.161	76	S	--
10	S	40	4.050				
11	P	38	4.026	.407	77	S	--
11	S	41	4.293				
12	P	38	5.526	1.043	78	S	--
12	S	42	5.595				
13	P	38	4.289	.783	78	S	--
13	S	42	4.833				
14	P	38	3.842	.613	78	S	--
14	S	42	4.119				
15	P	38	4.711	.870	78	S	--
15	S	42	4.881				

Table 20.3

_t_ tests
measurement 2--trial 2

scale	variable	n	m	_t_	df	favor	p
1	P	27	3.852	.119	56	P	--
1	S	31	3.807				
2	P	27	4.704	.509	56	S	--
2	S	31	4.936				
3	P	27	6.074	.993	56	P	--
3	S	31	5.645				
4	P	27	4.185	.828	56	S	--
4	S	31	4.484				
5	P	27	3.889	2.642	55	S	.05
5	S	30	4.700				
6	P	26	4.269	1.667	55	P	--
6	S	31	4.194				
7	P	27	4.926	.804	56	P	--
7	S	31	4.484				
8	P	27	4.185	.640	56	P	--
8	S	31	3.871				
9	P	27	4.185	.237	56	P	--
9	S	31	4.065				
10	P	27	4.345	.437	56	S	--
10	S	31	4.484				
11	P	27	4.148	.894	56	P	--
11	S	31	3.742				
12	P	27	5.815	.840	56	P	--
12	S	31	5.420				
13	P	27	4.519	.705	56	P	--
13	S	31	4.129				
14	P	27	3.889	.626	56	P	--
14	S	31	3.581				
15	P	27	5.222	2.087	56	P	.05
15	S	31	4.097				

TABLE: EXPERIMENT 21

VISUAL AIDS PLACED IN STUDENTS' HANDS CONTRASTED WITH PRESENTATION ON TELEVISION SCREEN

Variables: visual aids placed in students' hands only (H) vs.
visual aids presented on T V screen only (TV)

Measurement: ability to answer questions on lecture content

Statistical test: *t* test

Table 21.1

t tests

trial	variable	n	m	*t*	df	favor	p
1	H	35	17.714	2.375	72	H	.05
1	TV	39	14.051				
2	H	28	13.393	1.305	54	TV	--
2	TV	28	15.393				

TABLE: EXPERIMENT 22

RHYTHMIC SWITCHING IN THE TEACHING OF METRICS

Variables: rhythmic switching (R) used to reinforce concepts of metrical structure vs. a single fixed picture (F)

Measurements:
1. ability to perform a particular operation in metrical analysis
2. ability to perform another particular operation in metrical analysis

Statistical test: *t* test

Table 22.1

t tests

trial	variable	measurement	n	m	*t*	df	favor	p
1	R	1	39	9.282	1.306	76	R	—
1	F	1	39	8.103				
2	R	1	31	8.774	.238	59	F	--
2	F	1	30	9.033				
1	R	2	39	9.333	.026	76	F	--
1	F	2	39	9.359				
2	R	2	31	11.226	1.324	59	R	--
2	F	2	30	9.633				
1	R	1-2	78	18.615	.744	154	R	--
1	F	1-2	78	17.462				
2	R	1-2	62	20.000	.645	120	R	--
2	F	1-2	60	18.667				

TABLE: EXPERIMENT 23

SWITCH CONTRASTED WITH ON-AIR RACKOVER

Variables: switch (S) vs. on-air rackover (OAR)

Measurement: ability to recall material emphasized either by switching or by on-air racking over to another lense

Statistical test: *t* test

Table 23.1

t test

variable	n	m	*t*	df	favor	p
S OAR	37 35	13.189 16.971	3.969	70	OAR	.001

TABLE: EXPERIMENT 24

ON-AIR RACKOVER CONTRASTED WITH CONCEALED RACKOVER

Variables: on-air rackover (OAR) vs. concealed rackover (CR) achieved by cutting to black for the time taken to rack from one lense to another

Measurement: ability to recall material emphasized either by an on-air rackover or a concealed rackover

Statistical test: t test

Table 24.1

t test

variable	n	m	t	df	favor	p
CR	27	13.593	.793	54	OAR	--
OAR	29	14.379				

TABLE: EXPERIMENT 25

CONCEALED RACKOVER CONTRASTED WITH SWITCH

Variables: concealed rackover (CR) vs. switch (S)

Measurement: ability to recall material emphasized either by a concealed rackover or by a switch

Statistical test: *t* test

Table 25.1

t test

variable	n	m	*t*	df	favor	p
CR	35	12.314	1.616	70	S	--
S	37	13.919				

TABLE: EXPERIMENT 26

ZOOM CONTRASTED WITH SWITCH

Variables: zoom (Z) vs. switch (S)

Measurement: ability to recall material emphasized either by a zoom or by a switch

Statistical test: t test

Table 26.1

t test

variable	n	m	t	df	favor	p
Z	27	12.667	.557	54	Z	--
S	29	12.034				

APPENDIX B

TESTING PROCEDURES

Testing: Experiment 1

Test 1

The lecture is built up from a key word outline of three main heads and fifteen sub-heads. These organizational units are labelled by the appearance of key words superimposed over the picture of the instructor. This test calls for reproducing the key word outline. Scored for omissions and improper indentations.

Test 2

Correct key word outline appears as left-hand column of mimeographed form given student after first test is collected. Seventeen numbered columns appear on the right. Instructor repeats seventeen details from lecture, indicates, for each, the row corresponding to the sub-heading to which that detail belongs. Thus, question three is the third detail given in the test. The student looks down the third column, sees fifteen rows, determines which row runs across to the sub-heading to which this detail belongs, and marks his choice of row where it crosses third column. Scored for number incorrect.

Testing: Experiment 2

Test 1

The student is shown forty randomly arranged items: twenty of them words that are read aloud, twenty of them pictures of objects that are named. After all have been shown, the student recalls as many as possible, writing down the words and the names of the objects. Scored for words correct, pictures correct.

Test 2

Student is shown ten words and ten symbols in random order and without audio. Student recalls as many of the twenty items as possible, writing down the words, duplicating the symbols. Scored for words correct, symbols correct.

Test 3

Ten objective, completion-type questions are asked on the instructional content. Scored for answers correct.

Testing: Experiment 1

Test 1

Thirty words--fifteen normal, fifteen distorted--are presented on the television screen in random order. After all thirty items have been shown, the student writes down as many as he can recall. Scored for normal correct, distorted correct (distorted are not required to be recalled in distorted form).

Test 2

Student answers ten objective, completion-type questions on the lecture. Questions deal with concepts reinforced by visuals (clear to one room, distorted to the other). Scored, for each viewing group, as number correct.

Test 3

Delayed recall (after lecture and test on lecture) of the thirty items presented for Test 1. Scored for normal correct, distorted correct.

Testing: Experiment 4

Student is instructed in how to take notes, distinguishing four levels of organization by means of Roman numerals, capital letters, Arabic numerals, and lower case letters--with appropriate indentation. After the lecture, he is told that the lecturer had thirty headings in his key word outline. The student is given these headings, on a mimeographed form, in random order with no indentation and told to arrange them in proper sequence, with proper indentation and with proper numeral or letter designations. Scored for errors of sequence and of indentation.

Testing: Experiment 5

Test 1

Student is asked to perform four tasks of emotion analysis (major emotional divisions): scored correct or incorrect.

a) determine the number of divisions in a passage read aloud by the instructor

b) make a multiple choice selection of most descriptive label for first division of a second passage read aloud by the instructor

c) do likewise for the second division of this passage

d) do likewise for the third division of this passage

Test 2

Student is asked to perform three tasks of emotion analysis (subtle shadings):

a) approximate the number of shadings in a passage read aloud by the instructor (scored by counting deviation from correct answer)

b) mark off the shadings in a passage in hand and also heard read aloud (scored 50 minus errors)

c) mark off the shadings in a passage in hand but not heard read aloud (scored 50 minus errors)

Testing: Experiment 6

Using such symbols as I, A, 1, a, 1), a) to designate the relations of headings and sub-headings down to six levels of organization, the student is instructed to relate the correct symbol to the correct key word item in a list of forty-four key word items presented in random order on a mimeographed form. Student receives this form at conclusion of lecture. Scored for number correct.

Testing: Experiment 7

Student is given a mimeographed written language sample of 100 words and instructed to perform three tasks:

a) underline lexical items

b) place diagonal line after each partial syntactic pattern

c) distinguish partial from complete patterns by appropriate use of markings presented in lecture

The scoring of the first task is done by subtracting from the number of words (100) the number of words marked incorrectly. The scoring of the second task is done by subtracting from the number of spaces (100) the number of spaces marked incorrectly. The scoring of the third task is similar to that of the second, but different marking symbols are involved. Finally, a score is computed for the student which is an average of the other three.

Testing: Experiment 8

Test 1

Student is shown twenty sustained words and twenty pulsated words (whatever is sustained for one group is pulsated for the other) in random order, after which he is asked to write down as many as he can recall. Scored for number correct.

Test 2

Fifty-two concepts developed in a lecture are reinforced by word visuals, all of which are sustained in one room, pulsated in the other room. After lecture, student takes a test of ten completion-type questions on ten of the fifty-two reinforced concepts. Scored for number of answers correct.

Testing: Experiment 9

Test 1

Student sees twenty visuals (10 completely fixed: 5 audio reinforced, 5 unreinforced; 10 uncovered by a wipe: 5 audio reinforced, 5 unreinforced) presented in random order, after which he writes down as many as he can recall. The visuals are key concepts consisting of one or two words each. Scored for number correctly recalled.

Test 2

Twenty visuals (words or phrases) are presented during the lecture to reinforce specific relationships between the twenty visualized concepts and twenty others. The twenty pairs of concepts are then arranged in two columns on a mimeographed form. Randomization is employed to determine which one of each pair is assigned to one column rather than the other, and to determine the item order within each column. Items in one column are numbered. Student places these numbers beside items in the other column so as to match related items. Scored for number of correct matchings.

Testing: Experiment 10

Student is to label five passages of verse so as to identify the basic metrical structure of each. Two of these passages are only heard by the student, two are heard and also seen on the test paper, one is only seen on the test paper. Scored for correct or incorrect labels.

Testing: Experiment 11

Test 1

Student is asked to mark ten scales on a semantic differential type attitude form: 1) interesting-boring, 2) fast-slow, 3) clear-confused, 4) good-bad, 5) sharp-dull, 6) lively-dead, 7) varied-monotonous, 8) animated-listless, 9) organized-disorganized, 10) satisfactory-unsatisfactory. Scoring is by position of mark (number coded) on each scale.

Test 2

Student answers twenty objective questions (10 true-false, 10 completion) on material presented in televised lesson. Scored for number correct.

Testing: Experiment 12

Student takes a twelve item objective test. Questions are completion type on lecture material. Some informational elements presented in lecture are given no technical emphasis; some are emphasized by a cut to a close-up of the lecturer; some by dollying in to a close-up of lecturer. For each student taking the test at end of lecture, four concepts are reinforced by a dolly, four by a switch, four are presented with no picture change. Test is scored by determining how many of the dolly-emphasized concepts are answered correctly; how many of the switch-emphasized; how many with no emphasis.

Testing: Experiment 13

Test 1

After the televised lecture, student receives test form consisting of two columns of twenty items each. Items in left-hand column are numbered; those in right-hand column have black lines following them. Student places numbers in blank spaces to match items. Matching constitutes a test of understanding of lecture information. Scored for number of correct matchings.

Test 2

Student is asked to mark ten scales on a semantic differential type attitude form: 1) interesting-boring, 2) fast-slow, 3) clear-confused, 4) good-bad, 5) sharp-dull, 6) lively-dead, 7) varied-monotonous, 8) animated-listless, 9) organized-disorganized, 10) satisfactory-unsatisfactory. Scoring is by position of mark (number coded) on each scale.

Testing: Experiment 14

Test 1

Student takes matching test (see experiment 13) on lecture content. Twenty items in one column matched with twenty items in other column. Scored for number of correct matchings.

Test 2

Student is asked to mark ten scales on a semantic differential type attitude form: 1) interesting-boring, 2) fast-slow, 3) clear-confused, 4) good-bad, 5) sharp-dull, 6) lively-dead, 7) varied-monotonous, 8) animated-listless, 9) organized-disorganized, 10) satisfactory-unsatisfactory. Scoring is by position of mark (number coded) on each scale.

Testing: Experiment 15

Student is shown forty items (20 words: 10 in process, 10 formed; 20 abstractions: 10 in process, 10 formed) in random order. He then writes down as many of the words and duplicates as many of the abstractions as he can recall. Scored for number of items correctly recalled.

Testing: Experiment 16

Test 1

Student takes a twenty question completion-type test on the instructional content. Scored for answers correct.

Test 2

Student marks a fifteen scale semantic differential type attitude form: 1) fast-slow, 2) weak-strong, 3) disorganized-organized, 4) soft-hard, 5) large-small, 6) monotonous-varied, 7) satisfactory-unsatisfactory, 8) listless-animated, 9) active-passive, 10) delicate-rugged, 11) sharp-dull, 12) confused-clear, 13) interesting-boring, 14) lively-dead, 15) bad-good. Scoring is by position of mark (number coded) on each scale. (It may be noted here that the procedure for taking the fifteen scale "test" is exactly the same as that for the ten scale "test" and, in both instances, use was made of the same instruction sheet. An example of this sheet is included in the appendix--see B12.

Testing: Experiment 17

Test 1

Student takes a twenty item completion type test on lecture content. Scored for answers correct.

Test 2

Student marks a fifteen scale semantic differential type attitude form: 1) fast-slow, 2) weak-strong, 3) disorganized-organized, 4) soft-hard, 5) large-small, 6) monotonous-varied, 7) satisfactory-unsatisfactory, 8) listless-animated, 9) active-passive, 10) delicate-rugged, 11) sharp-dull, 12) confused-clear, 13) interesting-boring, 14) lively-dead, 15) bad-good. Scoring is by position of mark (number coded) on each scale.

Testing: Experiment 18

Test 1

Student listens to a passage being read aloud and presented with a specific television procedure. The student then marks on a seven point scale his rating of the overall impact of the passage. Scale positions are labelled: excellent, very good, good, mediocre, poor, very poor, miserable. The scale is arranged vertically with "excellent" at the top and "miserable" at the bottom. After rating this passage on Test 2 (below), student hears a second passage which he rates on this impact scale also. Scoring is done by assigning numbers to scale positions: 7 to the top position, 1 to the bottom position.

Test 2

The same seven point scale is used by the student to rate TV technique right after rating overall impact on each passage. Scoring is the same as on Test 1 (above).

Testing: Experiment 19

After hearing a passage read aloud twice (with or without seeing the reader--depending on viewing room), student answers twenty completion-type questions on the passage. Student then hears a second passage read aloud twice (without or with a television view of the reader--the reverse of whatever condition existed for first passage) and answers an additional twenty completion-type questions on content of this second passage. Scoring is for number correct on each passage.

Testing: Experiment 20

Test 1

During instructional presentation, student sees visuals reinforcing certain concepts. These visuals are placed on the screen by a switch for one viewing room, by a pan for the other. After the presentation, the student takes a twenty item completion-type test on the concepts reinforced by the visuals. Scoring is for answers correct.

Test 2

Student marks fifteen scale semantic differential type attitude form: 1) fast-slow, 2) weak-strong, 3) disorganized-organized, 4) soft-hard, 5) large-small, 6) monotonous-varied, 7) satisfactory-unsatisfactory, 8) listless-animated, 9) active-passive, 10) delicate-rugged, 11) sharp-dull, 12) confused-clear, 13) interesting-boring, 14) lively-dead, 15) bad-good. Scoring is by position of mark (number coded) on each scale.

Testing: Experiment 21

Student receives instruction, obtaining key facts from charts presented on television (if he is in one viewing room) or on mimeographed forms handed to him before lesson begins (if he is in other viewing room). Instructor refers to the charts but does not audibly present the specifics shown on the charts. At conclusion of lecture, student takes a twenty-six item completion-type test on the specifics shown on the charts. Scoring is for answers correct.

Testing: Experiment 22

Test 1

Student hears read aloud twenty-five distinctly different lines of verse and is asked to identify the basic foot structure of each (a 25-item test). Scored for answers correct.

Test 2

Upon hearing the lines of verse (Test 1, above), student is to identify number of metrical feet in each line (a 25-item test). Scored for answers correct.

Testing: Experiments 23-26

Important lecture concepts are reinforced by twenty visuals (a different paired-type of visual for each experiment; a different one of each pair for each viewing room). At conclusion of lecture, student recalls as many of these reinforced concepts as possible. Scored for correctly recalled reinforced concepts.

SAMPLE: ATTITUDE SCALE INSTRUCTION SHEET

Viewing room:____________

DO NOT PUT YOUR NAME ON THIS PAPER

This questionnaire is designed to determine your impression of certain aspects of the lecture you have just heard. This will be accomplished through the use of seven-position scales, as in the following examples:

Suppose, on the dimension meaningful-meaningless, you feel that your response to the lecture is very closely associated with one end of the scale showing this dimension. Then, depending on which end of the scale you wish to designate, you should place an "X" as follows:

meaningful X/ _/ _/ _/ _/ _/ _/ meaningless

OR

meaningful _/ _/ _/ _/ _/ _/ X/ meaningless

If you feel the lecture is quite closely related to one or the other end of the scale, you should place your "X" as follows:

meaningful _/ X/ _/ _/ _/ _/ _/ meaningless

OR

meaningful _/ _/ _/ _/ _/ X/ _/ meaningless

If it seems to you that the lecture is only slightly related to one side as opposed to the other, you might "X" as follows:

meaningful _/ _/ X/ _/ _/ _/ _/ meaningless

OR

meaningful _/ _/ _/ _/ X/ _/ _/ meaningless

Please be certain to place an "X" on each scale. If you consider the scale irrelevant, or that the lecture fits halfway between the two ends of the scale, place the "X" in the middle space of the scale:

meaningful _/ _/ _/ X/ _/ _/ _/ meaningless

Actually, the scales in this questionnaire deal with other dimensions of the lecture. Answer with complete honesty. Place "X" on each scale. Do not spend more than a few seconds marking each scale, however. Your first impression is what we would like to learn about.

Thank you.

SAMPLE CHARTS: EXPERIMENT 21

CHART #3

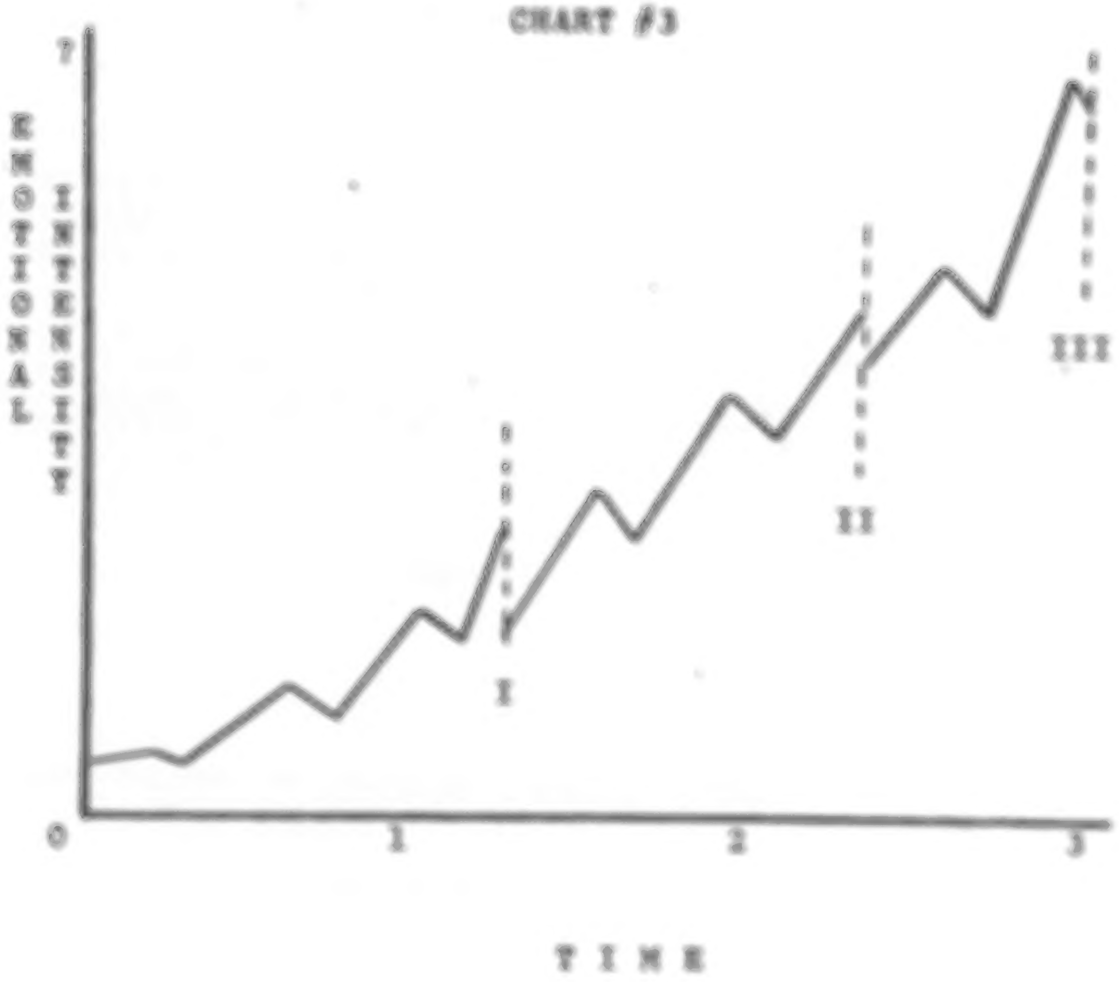


CHART #4

IAMB	∪ –	TROCHEE	– ∪
ANAPEST	∪ ∪ –	DACTYL	– ∪ ∪
SPONDEE	– –	AMPHIBRACH	∪ – ∪